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STEVENS
ON
STOWAGE.



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ON THE

STOWAGE OF SHIPS

AND THEIR

CARGOES,

BY ROBERT WHITE STEVENS.

1858.

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This compilation was originally intended to assist young sea officers in the stowage of a variety of goods in a ship's hold, but other subjects, such as freightage, &c. were found to be so intimately connected with stowage, that it became necessary to append remarks on them. The reader is kindly requested to bear in mind the following facts, viz.—that this is the first attempt to compile, in a systematic form, instructions on the subject of stowage; in the next place, that those best acquainted with the art do not agree in many particulars; and lastly, that in stowing some cargoes there is a confliction of interests between the merchant and the shipmaster. To meet these difficulties, the manuscript was submitted for correction, to several authorities experienced in the coasting, colonial, and foreign trades; and while passing through the press, proofs of every article on the superior branches of commerce, were sent to merchants, shipmasters, and manufacturers engaged therein. There may, however, still exist a difference of opinion on certain points, and communications thereon will be greatly esteemed by the publisher, in order that a work which it is hoped will prove useful to the mercantile community, may be made more complete in future editions.

In preparing this work the following authorities have been consulted :

McCulloch's Dictionary of Commerce.

Harrison's Freighter's Guide.

Gordon's Charterer's Companion.

Baltic Shipmaster's Guide.

Chapman's sheet on the stowage of mixed cargoes.

Sedgwick's Golden Hints to Young Mariners.

Lorimer's Letters to a Master Mariner.

Murphy's Nautical Routine.

Brady's Kedge Anchor.

The Mate and his Duties.

Lee's Laws of Shipping.

Manley Hopkins on Average.

Shipping and Mercantile Gazette.

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STOWAGE OF SHIPS.

SHIPS of equal burden, bound on the same voyage, will often require cargo or ballast materially different in quantity; the proportion being always less or more according to the sharpness or flatness of the bottom, called by seamen the floor. Ships, generally, will not carry sufficient sail till they are laden so that the surface of the water nearly glances on the extreme breadth midships: peculiar attention must, therefore, be paid to the proper mode of ballasting.

2 The object is so to dispose of the cargo that the ship may be duly poised, and maintain a proper equilibrium; to be neither too stiff nor too crank—qualities equally pernicious. If too stiff, she may carry much sail, but her velocity will not be proportionably increased, whilst her masts are endangered by sudden jerks and excessive labouring: if too crank, she will be unfit to carry sail without the risk of oversetting.

3 Stiffness is occasioned by disposing too great a quantity of heavy ballast, as lead, iron, &c, in the bottom, which throws the centre of gravity very near the keel; and this being the centre about which the vibrations are made, the lower it is placed the more violent is the rolling.

4 Crankness, on the other hand, is caused by not having sufficient ballast, or by disposing the lading so as to raise the centre of gravity too high.

5 Hence the art of ballasting consists in placing the centre of gravity to correspond with the trim and shape of the vessel, neither too high nor too low, neither too far forward nor too far aft; and to lade her so deep that the surface of the water may nearly rise to the extreme breadth midships: she will then carry a good quantity of sail, incline but little, and ply well to windward.

6 Some authorities contend that no vessel, bound on any over-sea voyage, should be loaded beyond that point of immersion which will present a clear side out of the water, when upright, of three inches to every foot depth of hold, measured amidships, from the height of the deck at the side to the water. Others consider that over-sea ships should have one-fifth to one-fourth, and coasting vessels one-sixth to one-fifth clear, to their depth of hold.

7 The necessity of sailing all vessels on the line of flotation designed by the builder cannot be too strongly impressed on the attention of ship-masters. Instances have occurred where schooners of 200 tons have entered the port of discharge, drawing three feet water more aft than forward, when, by the lines of the builder, it never ought to exceed 18 or 20 inches. This is sometimes done without the knowledge of the master, by the mate and crew, who like the bow to be well out of the water, in order that they may have, what they call, a dry ship, forgetful of the consequent deterioration of her sailing qualities.

8 Ships that have cargoes of light goods on board require a quantity of ballast, increasing, of course, according to the greater lightness of the goods.

9 Masters should be cautious of loading some heavy cargoes upon brushwood and faggots, for it happens, occasionally, that the pressure on this sort of dunnage is so great as to squeeze it into a much smaller space than could at first have been supposed; so that after getting to sea ships are sometimes obliged to return to port to unload a part of their cargo, to prevent their foundering. In such cases, firm dunnage should, if possible, be always used.

10 One great point is to prevent the possibility of the cargo, or ballast, from shifting, in the most violent rollings of the vessel: a large proportion of the losses by foundering at sea is caused by insufficient attention to this particular.

11 Mr. FINCHAM (builder H.M. dockyard) says, the first object to be determined regarding stowage, is that the centre of gravity of all the weights be in the right point longitudinally, that is, in the same vertical line as the centre of gravity of the ship, so that she may float at the water line determined for her. This point is determined in the construction of the ship, and the stowage, as to this leading principle, is fixed in the design. The next consideration is that all the articles of store, &c, shall be so disposed as to be convenient of access, as they may be afterwards for use; and so distributed that their gradual consumption shall derange the trim of the ship as little as possible. In all cases when ballast is required to increase the stability of a ship, it should be kept as low as possible, being placed in the full part of the ship; but with regard to the rolling of a ship, the weights may be either too high or too low, when a ship is uneasy, by having an excess of weight below, depressing the centre of gravity too much; it is generally better to diminish the quantity of ballast, and to add a false keel, to give the ship more hold of the water, than to wing the ballast up for the purpose of raising the centre of gravity, as is sometimes done.

12 Mr. BRADY (Master in the U.S. Navy) says, as the stowage of a ship's hold and ballast depends so much on her build, it is not possible to lay down any precise rule; it is, however, recommended to preserve a strict line of *level* in the position of the tanks. To effect this and to produce the desired uniformity of surface, the stower must (speaking of ships of war) commence the stowage from the midship stanchions in the hold, and work outwards regularly towards the direction of the wings.

The slightest irregularity of surface in the tops of the tanks may be the means of throwing out the general stowage, and ultimately causing a considerable deficit in the quantity of water which the hold is calculated to contain. A short though rather a rough way, of calculating the weight of ballast required, is to allow one ton of ballast for ten of tonnage, for each class of vessels. Winging the ballast tends to make a vessel roll, and building up amidships to keep her steady. Without venturing on details it may be remarked, that the plan of keeping the ballast in the body of the ship and clear of the extremities, seems to be most generally approved of; while at the same time care should be taken to keep her on, or parallel to, the line of flotation designated by the builder.

13 In reference to clearing one end of a ship first, for the reception of a cargo, Capt. SEDGWICK (East India Company's Service) says, this practice cannot be too strongly condemned; it is most lubberly, and injurious to the vessel, and can only be pardonable when there is a leak to stop, or copper to be mended. The weight required in a ship should be kept amidships, and cargo put into the fore and after holds. Should the vessel be unusually crank, and require much cargo to stiffen her, before that which is left amidships can be removed, then it would be prudent, before all the weight is taken out, to let the cargo, put into each end of the ship, meet at the main hatchway as much as possible, so as to avoid having too much at either end, and none in the centre of the vessel. A little attention to these matters shows the intelligent officer: but the man who points either the head or stern of the vessel to the clouds, may depend that he is inflicting an eye-sore on every seaman in the port.

14 Vessels bound to the Baltic, to the Black Sea, and especially to the Sea of Azof, should be careful not to load too deeply; this applies, also, to vessels going up any great rivers. Vessels going direct to the Black Sea should take lighter cargoes than if they were bound only to Constantinople. The reason is this;—the density of the water of different seas is more or less considerable, and the vessels which sail in them sink in the water more or less accordingly. This density arises from the amount of salt contained in the water, and consequently the saltier the sea is, the less a vessel enters it. As, too, the more sail a vessel carries, the deeper she penetrates the water, it follows that the more the water is salt, the greater is the quantity of sail that can be carried. Now the Black Sea being sixteen times less salt than the Mediterranean, a vessel which leaves Toulon or Marseilles for Sebastopol, must take a lighter cargo than that which goes to Constantinople, and a still lighter one if she is to enter the Sea of Azof, which is eighteen times less salt than the Mediterranean. It is stated that the Mediterranean is twice as salt as the Atlantic, once more than the Adriatic, five times more than the Caspian Sea, twelve times more than the Ionian Sea, and seventeen times more than the Sea of Marmora. The Dead Sea contains more salt than any other sea; it is asserted that two tons of its water yield 589 pounds of salt and magnesia.

STOWAGE OF CARGOES.

15 The custom and usage of the port will, in a great degree, regulate the mode of loading ships, when there is no express condition to the contrary; but masters, being under the same penalties as common carriers, are nevertheless bound to place the goods in position so that they will be unlikely to injure each other, to keep them in safe custody, and to deliver them in good condition to the legal owner of the Bill of Lading.

16 It therefore follows that if goods liable to leak are placed over bale goods, or if a cask be stove when letting it down into the hold, the master is liable. Formerly, if a master stowed raisins, figs, alum, rice, corn, or other dry goods, in bags, bales, or sacks, below wine, beer, oil, grease, olives, or other merchandize, liable to leak, and the raisins, &c, were thereby damaged, the master paid the amount of damage. It is almost needless to add, that packages of silk ought not to be placed under casks of oil, or bales of muslin on salt.

17 Irrespective of the legal responsibilities, it is well known that shippers abroad, when aware that their cargoes will be stowed properly, will give a preference, and at higher rates, to those masters who undertake to guarantee the dunnage.

18 LORD CHIEF JUSTICE TENTERDEN says, in reference to the responsibility of masters, the disposal of the cargo by the master is a matter that requires the utmost caution on his part. He should always bear in mind that it is his *duty to convey it to the place of destination*. This is the purpose for which he has been intrusted with it, and this purpose he is bound to accomplish by every reasonable and practical method. What then is the master to do, if, by any disaster happening in the course of his voyage, he is unable to carry the goods to the place of destination or to deliver them there? To this, as a general question, I apprehend no answer can be given; every case must depend upon its own peculiar circumstances. The conduct proper to be adopted with respect to perishable goods will be improper with respect to a cargo not perishable: one thing may be fit to be done with fish or fruit, and another with timber or iron: one method may be proper in distant regions, another in the vicinity of the merchant—one in a frequented navigation, another on unfrequented shores.

19 The wreck of the ship is not necessarily followed by an impossibility of sending forward the goods; it does not, of itself, make their sale a measure of necessity or expedience: much less can the loss of the season, or of the proper course of the voyage, have this effect. An unexpected

interdiction of commerce, or a sudden war, may defeat the adventure and oblige the ship to stop in her course; but neither of these events doth, of itself alone, make it necessary to sell the cargo at the place to which it may be proper for the ship to resort. In these, and many other cases, the master may be discharged of his obligation to deliver the cargo at the place of destination; but it does not, therefore, follow that he is authorized to sell it, or ought to do so. What then is he to do? In general it may be said *he is to do that which a wise and prudent man will think most conducive for the benefit of all concerned*. In so doing he may expect to be saved, because the merchant will not have reason to be dissatisfied; but what this thing will be, no general rules can teach.

20 Some regard may be allowed to the interest of the ship and of its owners; but the interest of the cargo must not be sacrificed to it. Transshipment for the place of destination, if it be practicable, is the first object, because that is in furtherance of the original purpose: if that be impracticable, return, or a safe deposit, may be expedient. A disadvantageous sale (and almost every sale by the master will be disadvantageous) is the last thing he should think of, because he can only be justified by that necessity which supersedes all human laws.

21 LORD CAMPBELL gave a very important opinion in the Court of Queen's Bench, in May, 1856, regarding the liability of owners to deliver goods in good order. *GILLESPIE v. THOMPSON*.—"Alleged Bad Stowage of Flour on board American ship *Star of the West*.—This was an action brought to recover damages resulting to the plaintiffs by the alleged bad stowage of flour on a voyage from New York to Liverpool. The question came before the court under the provisions of the 15th and 16th Vict. cap.16, sec.46.

"In the month of April, 1854, the plaintiffs, who are merchants in New York, shipped in good order and condition on board the ship *Star of the West*, of which the defendants were then owners, then lying in that port, and bound for Liverpool, 1,526 barrels of flour, for which a Bill of Lading was signed by the master in the ordinary form. The ship had a miscellaneous cargo, consisting of 2,150 barrels of flour, 600 bales of cotton, 800 tierces of lard, 100 hogsheads of tallow, 250 barrels spirits of turpentine, 57 puncheons turpentine, 3,600 barrels of tar, and some other minor articles. Vessels from New York bring very miscellaneous cargoes, and flour and turpentine are sometimes brought in the same ship, but the plaintiffs, when they shipped the flour, had no notice and were not aware that turpentine was or would be shipped. On the arrival of the vessel in Liverpool it was discovered that the flour was tainted by turpentine, and under the advice of competent brokers in the corn trade, the flour was sold by auction, and owing to the damage it had thereby received, it produced £196 16 10*d.* less than its sound value. The damage had not resulted from sea damage, but it was caused by the fumes arising from the turpentine having reached and tainted the flour. The damage did not result from any direct contact between the flour and turpentine, for both were properly stowed and dunnaged, and care was taken to separate them from each other, and, save in so far as it may be considered improper in any case to place flour and turpentine in the

same vessel, there was no negligence or want of due care on the part of the owners, or master, of the ship, in the stowage of the flour and turpentine in question. Although flour and turpentine are sometimes shipped in the hold of the same vessel, it is the fact that flour carried with turpentine in many instances has received more or less damage from it; and the plaintiffs contended that it is improper stowage to place articles in the hold of the same vessel, so that the presence of one may damage another, and that as the damage in this case was not the result of the peril of the sea, the shipowner is bound to make good the loss. The question for the opinion of the court was, whether the defendants were liable to the plaintiffs for the damage sustained by the flour, under the circumstances. If the court should be of opinion that they were so liable, judgment of *nil dicit* was to be entered for the plaintiffs for £196 16 10*d.* damages. If the court should be of a contrary opinion their judgment of *nolle prosequi* is to be entered.—Mr. MANISTY appeared for the defendants, and Mr. BROWN for the plaintiffs.

“LORD CAMPBELL: The opinion of the court, without difficulty, is that as the owners of the ship took the goods in good order and condition, and undertook that they should be delivered in good order and condition, the dangers of the sea excepted; they were delivered in bad order and condition, being greatly deteriorated by the turpentine, that does not come within any express or implied exception; we think it has resulted from bad stowage, which has produced this effect. There is no doubt the owner of the ship is liable.

“Mr. MANISTY: I hope your lordship will say it is a fair case in which we should not bear the cost.

“LORD CAMPBELL: I think it a case in which the cost unquestionably ought to follow the event. You must take it as if you had proceeded and submitted everything that you thought proper for and required the deliberation of the court.”

22 There is an important clause in the Merchant Shipping Act, 1854, which limits the liability of owners, in regard to gold, silver, diamonds, watches, jewels, or precious stones. The clause is printed in full, below. A decision on this clause will be found under the heading Gold Dust.

Clause 503. No owner of any sea-going ship, or share therein, shall be liable to make good any loss, or damage, that may happen without his actual fault, or privity of or to any of the following things; that is to say:

(1) Of or to any goods, merchandize, or other things whatsoever, taken in or put on board any such ship, by reason of any fire happening on board such ship.

(2) Of or to any gold, silver, diamonds, watches, jewels, or precious stones, taken in or put on board any such ship, by reason of any robbery, embezzlement, making away with, or secreting thereof, unless the owner, or shipper, thereof has, at the time of shipping the same, inserted in his Bills of Lading, or otherwise declared in writing, to the master or owner of such ship, the true nature and value of such articles,

To any extent whatever.

23 The term Ton, with regard to the Freight of Goods, is an arbitrary term. The first approach to a system of tonnage appears to have been made on the East Coast of England, where a vessel called a Keel, is in constant use for loading ships with coal, the most important branch of trade there. A keel contains 21 tons 4 cwt, or 1,008 cubic feet, but when thrown in a ship's hold, is compressed to 850 cubic feet, or 40 cubic feet, per ton; and this is the standard by which, more or less, all goods are freighted on board ship. 20 cwt, also, of wheat in bulk, some sugars in bags, and sundry other articles, go to a ton, and measure each about 40 cubic feet.

If all other goods received on board ship weighed the same as coal, wheat, &c. (where the weight and measurement are so nearly equal) little difficulty would occur in regulating the freight. Being otherwise, the merchant and shipowner make a mutual arrangement, governed in some measure by the above data, for the conveyance of goods, which are, in some cases estimated by weight, in others by measurement, and in others by quantity, and number, but the term ton is retained in almost every case.

The difficulty which a master has to contend with in taking cargo, irrespective of the sharpness or flatness of his ship's bottom, is to know exactly how much of different sorts she will carry. This applies especially to such compressible articles as hay, hemp, cotton, hides, &c, and to cargoes of casks. Heavy goods are generally freighted by weight, and it sometimes happens that more than 20 cwt. are allowed to a ton for freight. Light goods are freighted by measurement, and it often occurs that more than 40 feet are allowed to a ton for freight, and that even then the weight is much less than 20 cwt:—

			cubic feet	cwt
<i>By Weight</i>	1 Ton Coal	... ..	40	20
	1 Ton East India Sugar, in bags	...	—	20
	1 Ton African Oak	... ..	40	23
	1 Ton Cinnamon, in bales	...	—	6
<i>By Measurement</i>	1 Ton East India Sugar, in chests	...	50	—
	1 Ton Cinnamon, in chests	... ..	50	—
	1 Ton Hides, East India	... ..	45	14
	If badly screwed, do.	... ..	60	14
<i>By Quantity</i> ...	8 Barrels Flour, of 196 lbs each	...	—	14
	36 Bush. American Wheat, in bulk	...	—	19
	1,000 Rattans	... ..	—	16

Besides these seeming discrepancies, the rates vary in different ports, as may be seen by comparing the rates in the various Tables annexed, which consist of the London Table of Goods proportioned in Stowage; Admiralty Table of Tonnage for Victualling and other Stores; Gross weight, tare, nett, and measurement of Government Stores; Baltic and Archangel Rates of Freight; Black Sea and Levant Rates; East India Company's Rates; and those for Bombay, Calcutta, and New York, &c.

A very useful table for finding the number of tons of coal a vessel will carry, will be found under the article Coal.

The mode of measuring the tonnage of ships for custom-house purposes, is specified in section 20, part 2, Merchant Shipping Act, 1854.

TABLE No. 1.

GOODS PROPORTIONED IN STOWAGE.

			Bulk	Gross weight in Tons	Cubic feet
8	Chaldrons or Waggon's Coal, 53 cwt. ea, in bulk	1	Keel	21·200	850
	Ditto, when compressed in the hold ...	1	do	20	do
97	Quarters Wheat ... 61·2lb $\frac{1}{2}$ bush	1	do	21·200	do
88	Quarters Tares, Beans, & Peas 63	1	do	20	do
105	Quarters Rye ... 57	1	do	21	do
108	Quarters Seed ... 52	1	do	20	do
114	Quarters Barley ... 52	1	do	21	do
125	Quarters Oats ... 37	1	do	16 $\frac{1}{2}$	do
16	Soda and other Alkalies, in casks ...	1	do	16	do
21	Ditto, in bulk ...	1	do	21	do
17	Tons Ashes ...	1	do	17	do
80	Casks of Pot and Pearl Ashes ...	1	do	16	do
10	Tons of Tree Bark ...	1	do	10	do
8	Tons of Coppice Bark ...	1	do	8	do
110	Tierces of Beef, 3 cwt. each ...	1	do	16 $\frac{1}{2}$	do
8	Tons of Bones (calcined) in bulk ...	1	do	8	do
12	Ditto, (Manure, &c.) in bulk ...	1	do	12	do
16	Ditto, (best quality) in bulk ...	1	do	16	do
100	Gross of Bottles—6 per gallon=19lb weight per doz. in bulk (Glass) ...	1	do	10	do
200	Ditto, $\frac{1}{2}$ Bottles=12 per gal=11lb weight per doz. in bulk ...	1	do	11 $\frac{1}{2}$	do
80	Crates Bottles, (Glass) 10 $\frac{1}{2}$ cubic feet each ...	1	do	10	do
120	Bags of Bread, 1 cwt. each ...	1	do	6	do
8,000	Common Bricks, ditto Tiles, in bulk ...	$\frac{3}{4}$	do	21	638
7,000	Fire Bricks ...	$\frac{3}{4}$	do	21	do
530	Firkins Butter, 70 lbs each ...	1	do	16 $\frac{1}{2}$	850
16	Chaldrons Cinders (Imperial) ...	1	do	10	do
40	Tierces Coffee, 7 cwt. average ...	1	do	14	do
230	Bags ditto, 7 $\frac{1}{2}$ cwt. average ...	1	do	17 $\frac{1}{2}$	do
20	Hogsheads Copperas ...	1	do	17	do
4 $\frac{1}{2}$	Tons Cork (Faro) ...	1	do	4 $\frac{1}{2}$	do
17	Tons Currants ...	1	do	17	do
8·333	Tons New Orleans and Mobile Cotton, all compressed ...	1	do	8·333	do
9·166	Ditto, best carrying ship ...	1	do	9·166	do
4·750	Ditto, Charleston & Savannah, not comp.	1	do	4·750	do
7·000	Ditto, Pernambuco and Maranham ...	1	do	7	do
9·700	Ditto, Alexandria, all compressed ...	1	do	9·700	do
5·000	Ditto, not compressed ...	1	do	5	do
16	Large Crates Earthenware ...	1	do	7	do
22	Mixed Crates, ...	1	do	9	do
28	Small Crates ...	1	do	10	do
140	Barrels Flour, 220 lbs each, 196 nett ...	1	do	13 $\frac{1}{2}$	do
160	Sacks Flour, 280 lbs each ...	1	do	20	do
60	Crates Glass (12 Tables) ...	1	do	5 $\frac{1}{2}$	do
50	Crates Glass (15 Tables) ...	1	do	5	do
40	Crates Glass (18 Tables) ...	1	do	4 $\frac{1}{2}$	do
26	Chaldrons Grindstones (mixed sorts) ...	$\frac{1}{2}$	do	21	425

TABLE No. 1, continued.

GOODS PROPORTIONED IN STOWAGE.

			Bulk	Gross weight in Tons	Cubic feet
10	Tons clean Hemp and Flax	... ..	1 Keel	10	850
9-107	Ditto, Outshot ditto	... ..	1 do	9-107	do
7-760	Ditto, Half clean ditto	... ..	1 do	7-760	do
5-825	Ditto, Codilla ditto	... ..	1 do	5-825	do
180	Barrels of Red Herrings	... ..	1 do	11	do
144	Barrels of White Herrings	... ..	1 do	21½	do
17	Tons Hides, salted	... ..	1 do	17	do
20	Hogsheads Lamp Black.	... ..	1 do	7	do
120	Bags Lamp Black	... ..	1 do	6	do
300	Pigs of Lead	... ..	½ do	22	283
9-444	Tons Mats of 400 pieces (Archangel)	... ..	1 do	8½	850
17	Tuns of Oil, 252 gallons	... ..	1 do	18½	do
20	Tons of Oil Cake	... ..	1 do	20	do
8	Do, Oranges & Lemons 10 chests or 20 boxes	10 chests or 20 boxes	1 do	10	do
100	Barrels Pitch (Archangel)	... ..	1 do	20	do
17	Tons Potatoes, in bulk	... ..	1 do	17	do
156	Barrels of Pork, 2 cwt each	... ..	1 do	15½	do
7-2727	Tons Dried Skins	... ..	1 do	7-2727	do
21	Ditto Slates	... ..	½ do	21	567
20	Hogsheads Sugar, 16½ cwt. average	... ..	1 do	16½	850
17	Tons Tallow, gross weight	... ..	1 do	17	do
100	Barrels Tar (Archangel)	... ..	1 do	16	do
100	Ditto (Stockholm)	... ..	1 do	16	do
136	Ditto Tar and Rosin (American)	... ..	1 do	17	do
17	Loads Timber (Baltic squared Fir)	... ..	1 do	18½	do
17	Loads Timber (No. American do)	... ..	1 do	13½	do
17	Loads Timber (Birch do)	... ..	1 do	22	do
14-923	Loads Masts (round)	... ..	1 do	17½	do
5-1515	Stand. Hund. Deal 120 pieces 12ft 11in 1½in	... ..	1 do	17	do
4-857	Ditto, Battens 120 " 12 7 2½	... ..	1 do	17-750	do
1-275	Mille Baltic Staves reduced, viz. 1,200 pces 66in long by 1½ thick	}	1 do	15-250	do
1-300	Do, Odessa do				
1-200	Do, Quebec do				
0-840	Do, Balt. Staves rough 1,200 pces 72in by 3½				
0-708	Do, Odessa do, 1,200 pieces 76 in by 3½				
1-054	Do, Quebec do, 1,200 pieces 66 by 2½	}	1 do	20	do
3-885	Do, W. India, 1,200 pieces 42 by 1½				
(The Staves to average 6 inches in breadth).					
17	Hogsheads of Tobacco	... ..	1 do	10	do
150	Carboys of Oil of Vitriol	... ..	1 do	8	do
17	Tuns Wine, Brandy, or other Spirits, reckoning the full gauge of the casks=4,284 gallons	... ..	1 do	20	do
4-444	Tons Wool	... ..	1 do	4-444	do
5-257	Ditto, compressed	... ..	1 do	5-257	do

According to the London Rates of Freight by Inspection, when wheat is 1s per quarter, beans, peas, and tares should be 1/1½, rye 11d, linseed 10½d, barley 10½d, and oats 9½d; timber 5/8½ per load; deals 17/1½ per standard hundred; clean hemp and flax 9/8½ per ton; oats and hemp 10/11, half clean hemp 12/1½, codilla 14/6½, and wool 19/4½, per ton.

TABLE No. 2.

**ADMIRALTY TABLE OF TONNAGE, FOR VICTUALLING
AND OTHER STORES.**

The Quantity to compose a Ton.

[March, 1854]

CASKS.

CASKS.—1 Leager; 2 Butts; 2½ Puncheons; 3 Hhds; 5 Barrels; 6 do. Soap; 7 Half Hogsheads and Kilderkins; 16 Half Hogsheads (Chocolate); 12 do. (Soap); 12 First-size Small Casks; 26 Small Casks (Chocolate); 24 do. (Soap); 24 do. (Soap) Second size and Barricoes; 50 Mess Kitts, Kegs, and Cans.

FOREIGN CASKS.—1 Tobacco Hogshead; 1½ Wine Pipe; 1½ Brandy do; 5 Tierces; and 7 Irish Barrels. 1 Rum Puncheon 24-40ths of a Ton.
(Casks of unusual sizes, according to their capacity for liquid measure, at the rate of 180 Imperial gallons to a ton; Cooperage utensils according to measurement.)

STAVES, HOOPS, &c.

OLD TIGHT STAVES.—190 Leagers; 240 Butts; 380 Puncheons; 450 Hogsheads; 560 Barrels; 720 Half Hogsheads and Small Casks.

HEADING, LARGE.—500 Puncheon Pieces; 500 Hogshead Pieces.
SMALL.—700 Barrel Pieces; 700 Half Hogshead Pieces.

OLD DRY STAVES.—750 Puncheons; 820 Hhds; 930 Barrels; 930 Half Hhds; 930 Small Casks.

HEADING, LARGE.—500 Puncheon Pieces; 500 Hhd. Pieces.
SMALL.—700 Barrel Pieces; 700 Half Hhd. Pieces.

FOREIGN STAVES.—240 Tobacco Casks; 350 Wine Pipes; 550 Rum Puncheons or Brandy Pipes; 930 Irish Tierces or Barrels.

PACKS.—6 Leagers; 8 Butts; 10 Puncheons; 12 Hhds; 14 Barrels; 18 Half Hhds; 7 Bread Puncheons.
50 Baltic Pipe Staves; 50 Quebec ditto.

HOOPS, &c.—30 Bundles of Hoops, 7 feet long and upwards; 50 do. under 7 feet; 15 cwt. Flattened; 10 do. Round; 14 Sets Truss Hoops, 14 to a set; 420 Hogshead Wood Hoops; 480 Barrels; 480 Kilderkins; 600 Firkins; 1,800 long Pink; 2,880 short ditto; 20 Bolts Flags; 120 Wreaths Twigs.

TANKS.

TANKS.—Whole, No. 1, equal to 2 20-40ths tons; No. 2, 2 4-40; No. 3, 1 28-40; Half No. 4, 34-40; No. 5, 34-40; No. 6, 34-40; No. 7, 34-40; Quarter, No. 8, 16-40; No. 9, Rider, 16-40; Bilge, No. 10, 1 26-40; No. 11, 1 6-40; No. 12, 20-40.
No. 13, 1 10-40. [Other description of measurement given when shipped.]

PROVISIONS.

PROVISIONS, &c.—6 Bags of Biscuit; 5 ditto, when packed in Casks; 8 Lemon Juice Cases; 16 Half do; 9 Tea Chests; 16 Half do; 500 Biscuit Bags, pressed; 700 Half do; 200 Meal Sacks; 500 lbs. Pressed Hay; 18 Cases Wine, 1 dozen each; 18 Cases Preserved Potatoes, 1 cwt; 22 do, half do; 5 quarters Wheat, in sacks; 10 sacks Salt, 2,240 lbs; 100 dozen Candles; 32 Tea Canisters of 20 lbs; 60 do. 10 lbs; 48 bushels Bran; 48 do. Pollard.

TABLE No. 2, continued.

ADMIRALTY TABLE OF TONNAGE, FOR VICTUALLING AND OTHER STORES.

The Quantity to compose a Ton.

[March, 1854]

SEAMEN'S CLOTHING.

SEAMEN'S CLOTHING, in Bales or Half Bales.—50 No. 1, Blue Cloth Jackets, equal to 4-40ths of a Ton; 25 do. 2-40; 50 of No. 2, 6-40; 25 do. 3-40; 50 pairs No. 1 Blue Cloth Trowsers, 4-40; 25 do. 2-40; 50 No. 2 do. 4-40; 25 do. 2-40; 69 yards No. 1 Blue Cloth for Jackets, 6-40; 84½ yards do. 3-40; 64 yards No. 2 do. 6-40; 32 yards do. 3-40; 67 yards No. 1 Blue Cloth for Trowsers, 4-40; 33½ yards do. 2-40; 62 yds No. 2 do. 4-40; 81 yds do. 2-40; 296 yards Duck, 4-40; 148 yards do. 2-40; 230 yards Flannel, 4-40; 115 yards do. 2-40; 144 yards Drill, 2-40; 50 Blue Knitted Jackets, 2-40; 25 do. 1-40; 150 pairs Worsted Stockings, 4-40; 75 pair do. 2-40; 100 pairs Mitts, 2-40; 50 pairs do. 1-40; 100 Caps, 2-40; 50 do. 1-40; 50 Serge Frocks, 8-40; 25 do. 3-40; 80 yards Blue Serge, 2-40; 25 Blankets, 8-40; 100 Shirts, 4-40; 50 do. 2-40; 100 Black Silk Handkerchiefs, 1-40; 50 do. 1-40; 25 Flushing Jackets, 8-40; 25 pairs Trowsers, 5-40; 48 yards for Jackets, 8-40; 30 yards for Trowsers, 5-40; 28 yards Blue Jean, 1-40; 50 pairs Boys' Stockings, 1-40; 50 Boys' Shirts, 1-40; 5 Hair Beds, 6-40; 2 single do. 3-40.

MARINE CLOTHING.

MARINE CLOTHING, made up, in Bales.—50 Coats equal to 6-40ths of a Ton; 50 Drill Jackets, 6-40; 50 pairs Trowsers, 6-40; 100 Shirts, 4-40; 150 pairs Stockings, 4-40.

MARINE CLOTHING, in Materials, packed in Bales.—25 Coats equal to 4-40ths of a Ton; 50 do. 7-40; 25 Drill Jackets, 3-40; 50 do. 5-40; 25 Trowsers, 3-40; 50 do. 5-40; 100 Duck Frocks or Trowsers, 4-40.

BARRACK STORES.

BARRACK STORES, in Bales.—50 Palliasse Cases equal to 4-40ths of a Ton; 100 Bolsters, 1-40; 50 Sheets, 3-40; 25 Round Towels, 1-40; 25 Bed Rugs, 6-40; 25 Sacking Bottoms, 3-40; 1 Coal Basket, 3-40; 100 Mop Handles, 7-40; 100 Broom Handles, 5-40; 25 Blankets, 8-40; 2 Hair Beds, 3-40.

MARINE NECESSARIES.

MARINE NECESSARIES, in Bales.—10 Great Coats equal to 3-40ths of a ton; 25 do. 8-40; 50 Coatees, 6-40; 50 Drill Jackets, 5-40; 50 pairs Trowsers, 6-40; 100 Shirts, 4-40; 150 pairs Stockings, 4-40; 200 Worsted Gloves, 1-40; 200 Hand Towels, 1-40; 50 Linen Bags, 2-40; 50 Shell Jackets, 5-40.

MARINE NECESSARIES, in Materials.—A Bale consisting of 25 Shell Jackets equal to 2-40ths of a ton; 50 do. 4-40; 12 pairs Grey Cloth Trowsers, 1-40. Other descriptions of Stores packed in Casks according to their sizes.

TABLE No. 3.

NAVAL PROVISIONS AND STORES.

(Department of the Comptroller for Victualling & Transport Service—average contents & weights)

PROVISIONS, &c.					PROVISIONS, &c.				
		Gross lb	tare lb	net lb		Gross lb	tare lb	net lb	
Biscuit ..	Bag .. lb	112	114	2	112	Oatmeal	Barrel bush	7½ 414 54 360	
Rum	Punch. gal	72	804	142	662	½ Hhd. ..	5½ 307 44 263		
	Hhd.	54	615	119	496	Kilderkin	3½ 213 32 181		
	Barrel ..	36	420	90	330	Sm. cask	2½ 146 26 120		
	½ Hhd. ..	25	293	63	230	" ..	2 121 20 101		
	Kilderkin	18	213	47	166	Sugar ..	Barrel lbs	392 465 73 392	
	Small cask	12	142	32	110	½ Hhd. ..	280 339 59 280		
White } Hhd. ..	54	634	106	528	Kilderkin	168 216 48 168			
Wine } Barrel ..	36	426	74	352	Sm. cask	140 173 33 140			
	½ Hhd. ..	25	306	63	243	" ..	112 142 30 112		
	Kilderkin	18	223	47	176	Chocolate ½ Hhd. ..	108 135 27 108		
	Sm. casks	10	130	32	98	Sm. cask	55 71 16 55		
Salt Beef	Tierce, 8lb	38	502	198	304	Tea	Chest ..	83 109 26 83	
	Bar. pieces	26	355	147	208	½ Chest..	36 52 16 36		
Salt Pork	Tierce, 4lb	80	513	193	320	Vinegar..	Punch. gal	72 864 140 724	
	Bar. pieces	52	341	133	208	Hhd. ..	54 662 119 543		
Flour ..	Barrel lbs	336	338	52	336	Barrel ..	36 450 88 362		
	½ Hhd. ..	250	294	44	250	½ Hhd. ..	25 317 65 252		
	Kilderkin	168	201	33	168	Kilderkin	18 230 49 181		
Suet ..	½ Hhd. ..	168	333	165	168	Sm. cask	12 152 32 120		
	" ..	150	339	189	150	Tobacco	Hhd. lbs	243 330 88 242	
	Kilderkin	115	250	135	115	Barrel ..	160 225 65 160		
	Sm. cask	70	184	114	70	½ Hhd. ..	126 180 54 126		
	" ..	56	132	76	56	Kilderkin	83 121 38 83		
Raisins	Barrel ..	336	388	52	336	Soap ..	Barrel ..	224 269 45 224	
	½ Hhd. ..	224	266	42	224	½ Hhd. ..	113 141 28 113		
	Kilderkin	168	200	32	168	Sm. cask	55 72 17 55		
	Sm. cask	112	140	28	112	Lemon juice, Case ..	72 183 111 72		
Peas ..	Barrel bush	5	376	54	322	½ Case ..	36 93 67 36		
	½ Hhd. ..	3½ 283 43 240			Tongues	Sm. cask No	36 200 65 135		
	Kilderkin	2½ 193 32 161			" ..	24 168 78 90			
					" ..	18 146 79 67			
					" ..	12 92 47 45			

EMPTY CASKS, &c

Average capacity in gallons and lbs.

		Gals	lbs			Gals	lbs
Tight Water Casks	Leager ..	164	270	Mess Utensils	Kit	1½	6
	Butt	110	176		Keg	1½	6
	Punccheon	72	144		Can	1½	6
	Hogshead	54	108		Barricoe	5½	16
	Barrel ..	36	80	Bread Casks..	To hold 56lb	16	30
	½ Hhd. ..	25	62		" 30	12	25
	Kilderkin	18	53		" 20	10	21
	Small cask	12	34	Lemon Juice..	Cases whole..	—	42
	" ..	8	24		" half ..	—	24
	Barricoe ..	10	25	Biscuit Bags..	Large	—	2
					Small	—	1½

Additional information regarding Casks, the mode of measurement, &c. will be found under the article Casks.

TABLE No. 4.

MARINE NECESSARIES, BOOKS, AND TANKS.

(Department of the Comptroller for Victualling & Transport Service—average contents & weights)

SLOP CLOTHING.						SLOP CLOTHING.						
	No	Gross lb	tare lb	net lb	cub. ft in		Pairs	Gross lb	tare lb	net lb	cub. ft in	
Blue cloth	l 50	163	3	160	7.6	Stockings	l 150	70	2	68	4.4	
Jackets, No. 1a	s 25	81	2	79	3.7	"	s 100	47	1½	45½	3.0	
Ditto, 1b	l 50	119	3	116	6.2	"	s 75	36	2	34	2.9	
Ditto, 2	s 25	59	2	57	3.5	Mitts	s 100	42	2	40	2.7	
Ditto, 2	l 50	139	3	136	8.0	Worsted caps..	l 100	53	2	51	3.7	
"	s 25	71	2	69	4.7	"	s 50	30	1	29	2.0	
Blue cloth	Pairs					Shoes barrel	100	199	73	126	—	
Trowsers, No. 1	l 50	103	2	106	6.2	"	½ Hhd.	50	122	63	59	—
Ditto, 2	s 25	53	1½	51½	3.3	Flushing trowsers	l 25	87	3	84	6.9	
"	l 50	108	2	106	6.2	Ditto for Jackets	l 48	143	3	140	8.7	
"	s 25	53	1½	51½	3.3	Ditto for trowsers	l 30	102	3	99	5.10	
Blue cloth, for	Yds					Blue baize, in the	l 80	85½	1½	84	6.3	
Jackets No. 1	s 34½	75	2	73	3.2	Blue serge, piece	s 80	33½	½	33	1.8	
Ditto, Trowsers	l 67	112	3	109	5.5	No						
No. 1	s 33½	56	2	54	2.9	Blue serge frocks	s 25	33½	½	33	1.8	
Ditto, Jackets	l 64	169	3	166	8.1	Blankets	l 25	115	3	112	9.0	
No. 2	s 32	84	2	82	4.2	Shirts	l 100	102	2	100	4.4	
Ditto, Trowsers	l 62	116	3	113	5.6	"	s 50	52	2	50	2.6	
No. 2	s 31	58	2	56	2.10	Handkerchiefs	s 100	8½	½	8	0.4½	
Duck, in the ..	l 296	189	3	186	4.10	Caps for boats' crews	l 100	—	—	—	7.4	
Piece	s 148	93	2	91	2.6	"	s 50	—	—	—	3.7	
Flannel in the	l 230	75	3	72	5.3	Flushing Jackets	l 25	129	3	126	9.6	
Piece	s 115	37	2	35	2.9							
White knitted	No											
worsted Jackets	l 50	69	3	66	5.4							
White wove	s 25	35	2	33	2.10							
worsted Jackets	l 50	57	2	55	3.7							
Blue wove	l 50	54	2	52	4.0							
worsted Jackets	s 25	27	1½	25½	2.4							
MARINE NECESSARIES.						BOYS' SLOPS.						
Foraging Caps bar.	No	lb	lb	lb	ft in	Blue cloth....	l 50	104	2½	101½	5.6	
Bale	l 50	32	2	30	3.0	Jackets	s 25	52	2	50	3.5	
"	s 12	8	1	7	2.0	Blue wove do..	s 50	33	2	31	2.2	
Grey cloth trow-	Pairs					White knitted do.	s 50	53	2	51	2.11	
sers, materials	l 12	28	1	27	1.1	Shirts	s 100	80	2	78	4.1	
Half Boots ... bar.	s 50	187	73	114	—	Hair Beds	l	9½	2	7½	1.5	
½ Hhd.	25	98	50	48	—							
RELIGIOUS BOOKS.						IRON TANKS.						
Bibles	No	lb	lb	lb	ft in	Whole, No. 1 ..	Gals	cwt	qrs	lbs	cub. ft in	
Prayer Books..	10	—	—	28	0.7	2 ..	600	10	1	14	98.3	
Psalter	10	—	—	9	0.2	3 ..	500	8	2	16	82.0	
Testaments ..	10	—	—	4	0.1	4 new	400	6	3	25	65.8	
Library bks, sets lar	318	253	60	193	7.11	5 rid.	200	4	2	25	33.2	
for frigates 173	148	35	113	4.8	6 flat	193	5	1	20	32.4		
small 111	126	30	96	3.10	7 old	200	4	1	24	32.10		
					Quarter ..	8 ..	100	2	3	20	16.6	
					9 rid.	100	2	3	20	16.6		
					Bilge ..	10 lar.	375	6	2	25	61.8	
					11 old	264	5	2	2	43.9		
					12 smt.	110	3	0	6	18.9		
						Bread Tanks made to mould; weight to be given when issued.						
						Water is computed at 210 gallons per Ton.						

The Italic letter *l* means large bales, *s* small bales, *rid.* rider, *bar.* barrel, *lar.* large, and *smt.* small.

TABLE No. 5.

BALTIC AND ARCHANGEL RATES OF FREIGHT.

ASHES, to pay 2-3ds the freight of clean hemp, on the gross weight.
 BRISTLES & tanned HIDES, 2-3rds freight of clean hemp, $\frac{1}{2}$ ton of 44 poods, gr.
 BEES' WAX (in mats), 2-3ds freight of clean hemp, $\frac{1}{2}$ ton of 63 poods, gr.
 BEES' WAX (in casks), same freight as clean hemp, $\frac{1}{2}$ ton of 63 poods, gr.
 FLAX, in all cases the same freight as hemp.
 FEATHERS, same freight as Codilla hemp, $\frac{1}{2}$ ton of 44 poods, gr.
 GRAIN—Wheat, 97 imperial quarters equal to 10 tons of clean hemp.
 Pease, Beans,* and Tares 10 $\frac{1}{2}$ cent more than freight of wheat.
 Rye, $7\frac{1}{2}$ $\frac{1}{2}$ cent, Linseed 10, Barley 15, Oats $22\frac{1}{2}$, less than freight of wheat.
 Sowing Linseed, 12 barrels in casks, $2\frac{1}{2}$ do. in bulk, equal to 1 ton of Rhine hemp.
 HARE SKINS, same freight as clean hemp, $\frac{1}{2}$ ton of 3,500 skins.
 HEMP + (from Petersburg), outshot 1-8th, half clean 1-4th, Codilla one-half more than freight of clean hemp.
 HEMP + (Riga), outshot 1-8th, Pass 1-4th, Codilla one-half more than freight of Rhine hemp—Polish and Rhine hemp on same footing.
 HIDES, Dried, 3-8ths more than freight of clean hemp, $\frac{1}{2}$ ton, gr.
 HIDES, Wet or Salted, 2-3ds freight of clean hemp, $\frac{1}{2}$ ton, gr.
 HORSE HAIR, Manufactured, double freight of clean hemp, $\frac{1}{2}$ ton of 44 poods, gr.
 HORSE MANES, 1-4th more than freight of clean hemp, $\frac{1}{2}$ ton 44 poods, gr.
 HORSE TAILS, same freight as clean hemp, $\frac{1}{2}$ ton of 44 poods, gr.
 ISINGLASS (bales), same freight as clean hemp, $\frac{1}{2}$ ton of 44 poods, gr.

* Egyptian should be the same as wheat.
 + Outshot should be 1-10th, half clean 3-10ths, codilla 7-10ths, wool compressed 9-10ths more than clean hemp; and wool uncompressed, 125 $\frac{1}{2}$ cent. more, or $2\frac{1}{2}$ times the rate of clean hemp, all $\frac{1}{2}$ ton of 20 cwt. English.

ISINGLASS (casks) 1-4th more than freight of clean hemp, $\frac{1}{2}$ ton of 44 poods, gr.
 LINENS, 80 pieces Flems, 90 do Ravenducks, 120 ditto Drillings, 80 ditto narrow, 1 ell, 40 ditto broad, 2 ells,—sheeting, 60 do Sailcloth, 6,000 Archans Broad Diaper Linens or Crash, 8,000 ditto Archans narrow Linen Diaper or Huckabacks equal to 2-3rds of a ton of clean hemp.
 MATS (from Archangel), 5 $\frac{1}{2}$ cent. less than the freight of hemp, for any quantity not exceeding 1-6th of the ship's cargo, reckoning 400 pieces double, and 500 pieces single, to a ton.
 PITCH AND TAR, 100 barrels equal to 97 quarters of wheat imperial measure.
 TALLOW,* 2-3rds freight of clean hemp, on the gross weight.
 WOOD, not to be considered as coming under the denomination of stowage goods.
 Deals,† 120 pieces of Petersburg standard equal to 3 loads of timber.
 Wainscot Logs, 1-3rd more than freight of fir timber, $\frac{1}{2}$ load of 50 cubic feet, Custom-house calliper measure.
 Half Logs, for broken stowage, 2-3rds the freight of whole logs.
 Round Masts,‡ 33 feet, girt measure, equal to 1 load fir timber of 50 feet, Custom-house calliper measure.
 Staves (as cargo), 1 mille of running pipe equal to 20 loads of fir timber.
 Deal Ends (for broken stowage), 2-3rds freight of deals.
 Lathwood (for broken stowage), 1 fathom of 4 feet, equal to 1 load of timber.
 WOOL, double freight of clean hemp, $\frac{1}{2}$ ton of 63 poods, gross.

* $13\frac{1}{2}$ $\frac{1}{2}$ cent. out of proportion.
 † Deals 10 $\frac{1}{2}$ cent. more wood than 3 loads timber, besides extra dimensions and number of pieces.
 ‡ Girt measure is abolished, and the true content taken by calliper, which is in favour of the ship, viz. multiply the diameter by itself in inches, and that product by the length in feet, and divide by 183 for the cubic content, Custom-house measure. (Diam. in inches, to be taken at the middle of the mast.)

ADDENDA.—WHEAT from the Black Sea to pay $7\frac{1}{2}$ $\frac{1}{2}$ cent. more than the rate in the tables.
 LINSEED from the Black Sea to pay 5 $\frac{1}{2}$ cent. more than the rate in the tables.

ALL GRAIN in mats to pay $7\frac{1}{2}$ $\frac{1}{2}$ cent. more than in bulk.

ALL GRAIN in linen bags to pay 5 $\frac{1}{2}$ cent. more than in bulk.

MATS, exceeding the proportion of 5 tons of 400 double or 500 single mats to every 100 tons register, to pay 20 $\frac{1}{2}$ cent. more than the rate in the tables, to the extent of one-fourth of the cargo. Any larger proportion to be subject to a special agreement.

WAINSCOT LOGS, shipped as cargo, to pay 30 $\frac{1}{2}$ cent. more freight than fir timber, $\frac{1}{2}$ load of 50 cubic feet, Custom-house calliper measure.

BROKEN STOWAGE. A fathom of 4 feet lathwood to pay freight equal to one load of fir timber; deal ends two-thirds. The freight of deals, staves, and other broken stowage, to be subject to a special agreement.

TABLE No. 6.

BLACK SEA RATES OF FREIGHT.

Rates of Freight adapted to the Black Sea Trade, calculated according to the London Baltic Printed Rates.

Tallow £ Ton.	Wheat £ Quarter.	Linseed £ Quarter.	Peas, Beans, and Tares £ Quarter.	Rye £ Quarter.	Barley £ Quarter.	Oats £ Quarter.	Wool £ Ton of 63 Foods.
<i>s d</i>	<i>s d</i>	<i>s d</i>	<i>s d</i>	<i>s d</i>	<i>s d</i>	<i>s d</i>	<i>s d</i>
30 0	4 7-670	4 2-103	5 1-237	4 3-494	3 11-319	3 7-144	90 0
32 6	5 0-309	4 6-278	5 6-340	4 7-786	4 3-262	3 10-739	97 6
35 0	5 4-948	4 10-453	5 11-443	5 0-077	4 7-206	4 2-335	105 0
37 6	5 9-587	5 2-628	6 4-546	5 4-368	4 11-149	4 5-930	112 6
40 0	6 2-226	5 4-804	6 9-649	5 8-659	5 3-092	4 9-525	120 0
42 6	6 6-865	5 10-979	7 2-752	6 0-951	5 7-036	5 1-121	127 6
45 0	6 11-505	6 3-154	7 7-855	6 5-242	5 10-979	5 4-716	135 0
47 6	7 4-144	6 7-829	8 0-958	6 9-533	6 2-922	5 8-311	142 6
50 0	7 8-783	6 11-505	8 6-061	7 1-824	6 6-865	5 11-907	150 0
52 6	8 1-422	7 3-680	8 11-164	7 6-115	6 10-809	6 3-502	157 6
55 0	8 6-081	7 7-855	9 4-268	7 10-407	7 2-752	6 7-097	165 0
57 6	8 10-701	8 0-030	9 9-371	8 2-698	7 6-695	6 10-693	172 6
60 0	9 3-340	8 4-206	10 2-474	8 6-989	7 10-639	7 2-288	180 0
62 6	9 7-979	8 8-381	10 7-577	8 11-280	8 2-581	7 5-884	187 6
65 0	10 0-618	9 0-556	11 0-680	9 3-572	8 6-525	7 9-479	195 0
67 6	10 5-257	9 4-731	11 5-783	9 7-863	8 10-469	8 1-074	202 6
70 0	10 8-396	9 8-907	11 10-886	10 0-154	9 2-412	8 4-670	210 0
72 6	11 2-536	10 1-082	12 3-989	10 4-445	9 6-355	8 8-265	217 6
75 0	11 7-175	10 5-257	12 9-092	10 8-737	9 10-298	8 11-860	225 0
77 6	11 11-814	10 9-432	13 2-195	11 1-028	10 2-242	9 3-456	232 6
80 0	12 4-453	11 1-608	13 7-298	11 5-319	10 6-185	9 7-051	240 0
82 6	12 9-092	11 5-583	14 0-401	11 9-610	10 10-128	9 10-646	247 6
85 0	13 1-731	11 9-958	14 5-504	12 1-901	11 2-071	10 2-241	255 0
87 6	13 6-370	12 2-233	14 10-647	12 6-192	11 6-014	10 5-836	262 6
90 0	13 11-009	12 6-309	15 3-710	12 10-483	11 9-957	10 8-432	270 0
92 6	14 3-648	12 10-284	15 8-813	13 2-774	12 1-901	11 1-027	277 6
95 0	14 8-287	13 2-459	16 1-917	13 7-066	12 5-844	11 4-622	285 0
97 6	15 0-927	13 6-834	16 7-020	13 11-357	12 9-787	11 8-218	292 6
100 0	15 5-566	13 11-010	17 0-123	14 3-648	13 1-731	11 11-813	300 0
102 6	15 10-205	14 3-185	17 5-226	14 7-939	13 5-674	12 4-409	307 6
105 0	16 2-844	14 7-360	17 10-329	15 0-231	13 9-617	12 7-004	315 0
107 6	16 7-483	14 11-335	18 3-432	15 4-532	14 1-561	12 10-599	322 6
110 0	17 0-122	15 3-511	18 8-535	15 8-813	14 5-504	13 2-195	330 0
112 6	17 4-762	15 7-886	19 1-638	16 1-104	14 9-447	13 5-793	337 6
115 0	17 9-401	16 0-061	19 6-741	16 5-396	15 1-390	13 9-385	345 0
117 6	18 2-040	16 4-286	19 11-844	16 9-687	15 5-334	14 0-981	352 6
120 0	18 6-679	16 8-412	20 4-945	17 2-378	15 9-277	14 4-576	360 0

A Russian chetwert of corn is equal to 5-77 imperial bushels, English; hence 100 chetwerts=72-12 imperial quarters. A pood weighs 36 lbs. avoirdupois. In fixing freight for England, a ton is 63 poods of hemp, flax, tallow, iron, copper, and ashes; 44 poods of bristles, isinglass, leather, and wax; 5 doz. deals, 3,500 hare skins, 8 chetwerts of wheat or linseed, and 60 pieces of sail cloth.

TABLE No. 7.

LEVANT COMPANY'S RATES.

	£	s		£	s
Agaric	₤ ton	20	0	Olibanum	₤ ton 8 0
Almonds		6	0	Opium	10 0
Aloes		7	0	Orpiment	7 0
Alum		4	0	Otto of Roses	₤ lb. 0 4
Aniseed		6	0	Pease	₤ qr. 0 12
Balustines		20	0	Pellitory Root	₤ ton 10 0
Barley	₤ qr.	0	12	Pistacia Nuts	13 0
Beans		0	12	Raisins, in casks	4 0
Boxwood	₤ ton	2	0	Raisins, in drums	5 0
Brimstone		3	0	Rhubarb	15 0
Camel's Hair		12	0	Rice	4 0
Camphor		7	0	Saffron	12 0
Carpets	₤ 100 pks.	1	0	Sal Ammoniac	6 0
Cass. Fistula	₤ ton	14	0	Salip	6 0
Caviar		4	0	Scammony	12 0
Cocculus Indicus		7	0	Seeds, not enumerated	6 0
Coffee		6	0	Senna	17 0
Colquintida		20	0	Shagreen Skins	10 0
Copper		2	0	Sheep's Wool	9 0
Cotton Wool		13	0	Silk	14 0
Cotton Yarn		10	0	Skins, Sheep and Goat	₤ doz 0 2
Currants		4	0	Soap	₤ ton 4 0
Dragon's Blood		9	0	Sponge	14 0
Emery Stone		1	0	Tallow	4 0
Figs, in drums		5	0	Terra Umbra... ..	2 0
Figs, in casks and cases		4	0	Tobacco... ..	13 0
Flax or Hemp		13	0	Turbith	7 0
Galls		6	0	Turmeric	12 0
Goat Hair or Wool		12	0	Turpentine	7 0
Gums		7	0	Valonia, in bags	5 0
Gum Arabic		6	0	Valonia, in bulk	4 0
Hare Skins	₤ 100	0	2	Wax	5 0
Hides, raw	₤ ton	5	0	Wheat	₤ qr. 0 14
Honey		5	0	Whetstones, in casks	₤ ton 4 0
Linseed	₤ qr.	0	14	Whetstones, loose... ..	2 0
Madder Roots	₤ ton	8	0	Whisk Brooms	₤ args 2 0
Mohair Yarn... ..		12	0	Wine, 252 gallons... ..	₤ ton 5 0
Natron		4	0	Wood Ashes	4 0
Nuts, small	₤ bush	0	1/8	Wormwood	6 0
Nux des Bin... ..	₤ ton	12	0	Yellow Berries	5 0
Nux Vomica		12	0	Zedoary	7 0
Olive Oil	₤ 252 gals.	5	0		

TABLE No. 8.
TONNAGE SCHEDULE IN INDIA.

The left-hand column of each division shows how many cwt go to a ton freight; the right-hand column the number of cubic feet.

	Bengal	Madras	Bombay		Bengal	Madras	Bombay
Aloes, in bags cwt	20	20	—	Colombo Root, bg	—	—	14
boxes	20	20	—	Copra, in robbins	—	—	12
kegs	—	—	16	Coral, rough (not specimens) bags	20	—	20
Alum	20	20	20	Coriander	—	12	—
Annatto, in cases	—	—	50	Cotton, in bales..	50	50	50
Aniseed	8	8	—	piece goods ..	—	50	—
Apparel.....	50	50	50	Cowries, in bags	20	20	20
Arrowroot, cases	50	50	50	cases	—	—	50
Assafoetida, bags	20	20	—	Cubebs	—	—	12
boxes	20	20	—	Cummin seed, cases	—	—	50
cases	—	—	50	Cutch, unsc. bags	17	17	16
Barilla	20	20	20	Dates, wet	20	20	20
Bark, in bags ..	8	8	—	dry	16	16	16
Bees' Wax	—	20	—	Dholl	20	20	—
in cases	—	—	50	Dragons' blood, ca	—	—	50
Betel-nut	18	18	—	Ebony, square & strait	—	—	50
in bags	—	—	16	otherwise	—	—	20
Black Woodsqu straight log	—	—	50	Eleph'nts teeth bk	16	16	—
otherwise ..	—	—	20	cases	50	50	50
Books	50	50	50	bundles	—	—	18
Borax or tincal..	20	20	20	loose	—	—	20
cases	—	50	50	Fennigarick seed	—	16	—
Brimstone	20	20	—	Furniture	50	50	50
Bullion, & cent	—	—	—	Galingals	—	—	12
Cake-lac, in bags	16	16	—	Galls, in bags ..	—	—	16
Camphor, in cases	50	50	50	cases.....	—	—	50
Cardamoms, rob.	8	8	—	Garlic and Onions	12	12	—
boxes	50	50	50	Ginger, in bags .	12	12	12
bags	—	10	—	dry, cases....	—	50	50
Cassia, all sorts .	50	50	50	Gingelly seed ..	—	17	—
Castor Seed	—	15	—	Gram	20	20	20
Chassum	—	—	10	Ground nuts shelled	—	—	16
China Root, bags	11	11	—	Gums, in cases .	—	—	—
boxes	50	50	50	not enumerated	50	50	50
Chiretta	50	50	—	Olbanum, bags	—	18	16
Cigars	50	50	50	Gunny bags	50	50	—
Cinnamon, bales	—	—	6	cloth	50	50	—
cases	—	—	50	Gunjah	50	50	—
Cloves, bg or fraz	8	8	10	Hartall, in cases	—	—	50
chests	50	50	50	Hemp, scwd bales	50	50	50
Coals	20	20	20	loose, or bndles	—	—	7
Cochineal	50	50	—	Hides & skins scd	—	—	—
Cocoa, bags	—	—	12	bales, cured ..	50	—	50
Oculus Indicus,	—	—	—	loose & sm bndles	—	—	12
in bags	—	—	16	Hides	—	14	—
Coffee, bg or fraz	18	18	16	Hoofs, horn shavings,	—	—	—
robbins & casks	16	16	—	tips, all kinds..	20	20	16
cases	—	17	50	Horns, Cow or ..	—	—	—
Coir yarn & fibre, sc.ba.	50	50	50	Buffalo, loose .	20	20	16
bundles or loose	—	10	6	Deer, loose ..	20	16	8
rope in coils ..	—	—	8	Indigo, in cases .	50	50	50
Colocynth, cases	—	—	50				

Abbreviations bale, ba; bags, bg; bulk, bk; cases, ca; robbins, rob; screwed, sc; frazils, fraz.

TONNAGE SCHEDULE IN INDIA (continued.)

The left hand column of each division shows how many cwt go to a ton freight; the right-hand column the number of cubic feet.

	Bengal	Madras	Bombay		Bengal	Madras	Bombay
Jackwood	—	—	50	Rope, Coir in coils	—	10	—
Jute, in bales ..	50	50	—	Rum, in casks 2 puns 4 hhd	210 gal	—	—
Lac Dye, in shells	—	—	—	Safflower, so bales	50	50	50
or cases	50	50	50	cases	—	—	50
Lard	50	50	—	bags	—	—	10
Linseed, in bags	20	18	18	Sago, in cases ..	50	50	50
Mace, in cases ..	50	50	50	Sal Ammoniac, bg	15	15	18
Machinery	20	20	—	boxes or cases	50	50	50
Metals	20	20	—	Saltpetre	20	20	20
Mirabolanes	16	16	16	Salt	20	20	—
Molasses	20	20	—	Sand'l & sapanwood	—	—	—
Mother o' Pearl ..	—	—	—	for dunnage ..	20	20	16
in bags	20	20	20	Sealingwax, cases	50	50	50
chests	20	20	—	Seedlac, in cases	50	50	—
cases	—	—	50	bags	16	16	—
Munjeet, ca or ba	50	50	50	Senna, in bales ..	50	50	50
bund's or bags	—	—	12	bags	—	—	6
Musk, in cases ..	—	—	50	Shark's fins	—	16	—
Mustard or Rape	—	—	—	Sarsaparilla	—	50	—
Seed	20	18	17	Shells, rf, in bags	20	20	20
Nutmegs, in cases	—	—	—	Shell lac, in cases	50	50	—
chests, or casks	50	50	50	bags	16	16	—
Nux Vomica, bags	16	16	16	Silk Piece Goods	50	50	—
cases	—	—	50	Skins,	50	50	—
Nuts Ground in shell	12	—	—	Soap, Country, ca	50	50	50
shelled	—	16	—	bars	20	20	—
Oats	12	12	—	bags	15	15	—
Oils, in cases ..	20	20	—	Stick lac, in cases	50	50	—
any kind, casks	20	210 imp. gal	—	bags	16	16	—
Oil Seeds, & Khor	—	—	17	Sugar, in bags ..	20	20	20
Opium	Phchest	—	Phchest	Talc	20	20	20
Paddy, in bags ..	15	15	16	Tallow	—	—	50
Pease	20	20	—	cases or casks	20	20	—
Pepper, long	12	12	—	Tamarind do. ..	20	20	18
black, in robins	14	14	—	Tapioca	50	50	—
bags	—	16	16	Tea, in chests ..	50	50	50
Pimento	—	—	14	Teel Seed	20	—	17
Planks and Deals	50	50	—	Timber, Round ..	40	—	40
Plumbago, in bags	—	—	20	Timber, Hewn ..	50	50	—
Poppy seed	20	15	—	Teak, Square .	—	—	—
Putchuck	10	10	—	Planks, & Poon	—	—	50
Rattans, in bundles, whangees,	—	—	16	Tobacco, in bales	50	50	50
and canes	—	—	16	Tortoise Shells in	—	—	—
ground	—	—	16	chests	50	50	50
for dunnage ..	20	20	—	Turmeric, in bags	12	14	13
Raw Silk, bales ..	10	10	10	Tutenague	—	—	20
cases	—	—	50	Unrated Wood ..	—	—	14
Red wood dunn'ge	20	20	16	Wheat	20	20	20
Rhea, in bales ..	50	50	—	Wines & Spirits,	—	—	—
Rhubarb, in cases	—	—	50	casks & cases	—	—	50
Rice, in bags ..	40	20	20	Wool, in screwed	—	—	—
Roping, in coils	50	50	—	bales	50	50	50
Lines & twines	—	—	—	Zedoary	—	—	20
in bundles	14	14	—	All other articles, not enumerated,	—	—	—
				bales or cases .	50	50	—

Abbreviations bale, ba; bags, bg; bulk, bk; cases, ca; robins, rob; screwed, sc.

TABLE No. 9

CALCUTTA CARGOES, ON AN AVERAGE SCALE.

The calculations are only approximate, but sufficiently exact for all practical purposes.

	cub ft		cub ft
A ton of Saltpetre measures	36	A ton Poppyseed measures upwards of	78
Sugar	39	Indigo, 15 to 16 cwt, .. measures	50
Rice	45	Silk Jute or Chusam, 10 cwt. ..	50
14 cwt hides, which go to the ton }	45	Hemp weighs 15 cwt	48
if well screwed, average		Lac Dye, about 18 cwt.	60
If badly screwed, sometimes near	60	Silk in bales, 10 cwt.	64
Five bales Jute,* which go to the }	46	Silk Piece goods, cases 9 cwt. ..	50
ton, and weigh 15 cwt, average)		Cassia,† in cases 5 cwt.	50
Sometimes, when badly screwed	50	Rum in casks	60
A ton Shell Lac, 10 to 11 cwt.	50	Molasses in casks weighs about }	60
Rapeseed or Linseed	62	30 ½ cent. more than Rum .. }	

* Jute is sometimes shipped by measurement; 50 cub ft compressed in bales frequently weighs 17 cwt

† When Cassia is taken at 10 cwt. the rate of freight should be increased in proportion.

Assuming the rate of freight on Saltpetre to be £4 ½ ton, the following table is easily made by the average scale :—

Saltpetre .. £4 0 0	Lac Dye £5 11 1	Cassia £5 11 1
Hides 5 0 0	Sugar 4 6 8	Rice 5 0 0
Rapeseed .. 6 17 9	Jute 5 2 3	Shell Lac .. 5 11 1
Chusam .. 5 11 1	Indigo 5 11 1	Poppyseed .. 8 2 3
Silk in cases 5 11 1	Hemp 5 6 8	Rum; 6 13 4

A glance will shew that this Scale refers to the room taken by each article more than to its actual weight; but it will assist a Master in choosing his cargo, so as to get the best freight ruling in the market. Suppose him about to engage the vessel's dead-weight, which is saltpetre, sugar, or rice, it follows, that if saltpetre be £4 ½ ton and rice £4 10s, saltpetre is a better freight than rice. After engaging all the dead-weight, which should not be much over two-thirds, or three-fourths of her new register tonnage, then choose jute or hides, whichever bears the highest rate in the market. Hides are generally to be preferred; but the master should satisfy himself, before shipment, that they are well screwed.

(Sedgwick's Golden Hints.)

MADRAS TONNAGE.

Coir in bales, Cotton, Gunjah, Hemp, Jute, Munjeet, Senna leaf, Wool, and Sarsaparilla, are to be measured before shipment, and the measurement is to be entered on the face of the bill of lading. In measuring, the callipers are to take in the rope on one side of the bale, and leave it out on the other. Half inches are to be given and taken alternately. Ten bales ½ cent as a maximum, are to be measured, moiety to be chosen by the shipper and moiety by the ship; and in the event of any dispute arising, the bales are to be measured by a Surveyor to be permanently appointed by the Chamber of Commerce; the Surveyor's decision to be final, and his fee to be five rupees, half to be borne by each party. All other goods to be measured at port of discharge. *Ch. Com. Madras, June 1, 1854.*

BOMBAY TONNAGE.

The standard ton for measurement goods, to be 50 cubic feet. The freight on Oil to be paid on the full gauge of the cask ascertained at the port of discharge. When freight is payable on weight, it is to be on the nett weight delivered. *C. C. Bombay, June 6, 1850.*

TABLE No. 10.

**NEW YORK RATES OF FREIGHT,
OF THE QUANTITY OF GOODS TO COMPOSE A TON.**

1,568	lbs. of Coffee in casks, 1,830 ditto in bags, 1,120 lbs of Cocoa in casks, 1,307 ditto in bags.
952	lbs of Pimento in casks, 1,110 ditto in bags.
8	barrels of Flour of 196 lbs each.
6	barrels of Beef, Pork, Tallow, Pickled Fish, Pitch, Tar, and Turpentine.
20	cwt of pig and bar Iron, Potashes, Sugar, Logwood, Fustic, Nicaragua Wood, and all heavy Dye Woods, Rice, Honey, Copper Ore, and all other heavy goods.
16	cwt of Coffee, Cocoa, and dried Cod-fish in bulk, and 12 cwt dried Cod-fish in casks of any size.
6	cwt ship Bread in casks, 7 cwt in bags, and 8 cwt in bulk.
200	gallons (wine measure) reckoning the full contents of the casks, of Oil, Wine, Brandy, or other kind of liquors.
22	bushels of Grain, Pease, or Beans, in casks.
36	bushels of ditto in bulk.
36	bushels of European Salt, 31 bushels of Salt from the West Indies.
29	bushels of Sea Coal.
40	feet (cubic measure) of Mahogany, square Timber, Oak Plank, Pine, and other boards, Beaver, Firs, Peltry, Bees' Wax, Cotton, Wool, and Bale Goods of all kinds.
1	hogshead of Tobacco, and 10 cwt of dry Hides.
8	cwt of China raw Silk, 10 cwt nett Bohea, and 8 cwt green Tea.

**NEW YORK
TABLE OF MEASURES & WEIGHTS**

Of different Substances.		
	cub in	lb oz
Ton of water (nett) 250 gal—		
Cubic foot water, specific grav.	62	9
Sea water	64	2
New York harbour water	63	14
Cork	15	0
Tallow	59	0
Platina	1,218	75
Copper	486	75
Lead	709	05
Steel	489	08
Cast Iron	450	45
Bushel of Beans	100	63
Cord of wood, stowage ..	128	1,700
A man and his effects....	2 to 2½	cwt.

**NEW YORK
TABLE OF WEIGHT OF TIMBER**

	per cubic foot.			
	Green		Season'd.	
	lb	oz	lb	oz.
Live Oak	76	10	70	8
White Oak	59	14	54	0
Red Oak	63	12	60	10
Hickory	58	14	52	15
Locust	60	12	56	4
Cypress	48	3	36	0
Cedar	32	0	30	4
Maple	45	0	34	4
Yellow Pine	48	12	35	8
White Pine	36	12	30	11
Spruce	43	15	28	14
Elm	56	8	37	5
Beech	60	0	53	6
White Ash	58	3	50	0

NOTE. The average weight of the different species of timber, used in building and equipping ships of war in the U.S. Navy, may be reckoned about 50 lb to the cubic foot.

TABLE No. 11

BAHIA TONNAGE SCALE.

By Order of the Directors of the Bahia Commercial Association the Ton of different Articles of Produce is to be calculated as follows:—

Nett weight in	Bahia	England	France
	Arrobas	cwt of 112lb	Kilos
Sugar in cases, boxes, or barrels	70	20	1000
" bags	80½	23	1150
Coffee in barrels	63	18	900
" bags	73½	21	1050
Tobacco leaf in bales	42	12	600
" serons	56	16	800
" rolls	70	20	1000
" mangotes	73½	21	1050
Hides, dry	45	12½	645
" salted	56	16	800
" green	70	20	1000
Cotton, Maceia, or S. Francisco ...	29	8½	414
" Cachoeira	27	7½	586
Cocoa in bags	56	16	800
Tapioca in barrels	49	14	700
" bags	56	16	800
Jacaranda Logs	80½	23	1150
	Canadas	Old gal velhos	
Rum in pipes	105	210	
Molasses	90	180	

C. Pogetti, Bahia, 1851.

Rice in bags 28 cwt, barrels 18 cwt.
 Bones 12 cwt, hoofs 10 cwt.
 Molasses in pipes 181 old gals.
 Horns, Rio Grande or Buenos Ayres 2 mil, Bahia 3 mil.
 Coquilhos 8 mil.
 Cigars 40 cubic feet.

Public Ledger, Oct 17th, 1856.

NOTE. An *arroba* is 32 lbs or arratels. Six *canadas* make about 2½ gallons English.
 A *seron* is a stout skin or mat. A *mil* is one thousand.

FOR THE

MEDITERANEAN and LONDON Table of Proportionate Rates of Freight see page 94.

QUEBEC Table see page 150, conclusion of article TIMBER.

CHINA Rates see page 140, conclusion of article Tea.

TABLE No. 12.

**NEWCASTLE STATUTE COAL MEASURE CONVERTED
INTO WEIGHT,**

And compared with the Register Tonnage, N.M. of Ships, showing the number
of Chaldrons, Tons, or Keels of Coal a vessel will carry, at the rate of 14
Register Tons per Keel.

Chals.	Tons. Cwt.	Keels.	Reg. tons N.M.	Chals.	Tons. Cwts	Keels.	Reg. tons N.M.
1	2 13	$\frac{1}{8}$	$1\frac{1}{8}$	208	551 4	26	364
2	5 6	$\frac{1}{4}$	$3\frac{1}{4}$	216	572 8	27	378
3	7 19	$\frac{3}{8}$	$5\frac{1}{4}$	224	593 12	28	392
4	10 12	$\frac{1}{2}$	7	232	614 16	29	406
5	13 5	$\frac{5}{8}$	$8\frac{1}{2}$	240	636 0	30	420
6	15 18	$\frac{3}{4}$	$10\frac{1}{2}$	248	657 4	31	434
7	18 11	$\frac{7}{8}$	$12\frac{1}{2}$	256	678 8	32	448
8	21 4	1	14	264	699 12	33	562
16	42 8	2	28	272	720 16	34	476
24	63 12	3	42	280	742 0	35	490
32	84 16	4	56	288	763 4	36	504
40	106 0	5	70	296	784 8	37	518
48	127 4	6	84	304	805 12	38	532
56	148 8	7	98	312	826 16	39	546
64	169 12	8	112	320	848 0	40	560
72	190 16	9	126	328	869 4	41	574
80	212 0	10	140	336	890 8	42	588
88	233 4	11	154	344	911 12	43	602
96	254 8	12	168	352	932 16	44	616
104	275 12	13	182	360	954 0	45	630
112	296 16	14	196	368	975 4	46	644
120	318 0	15	210	376	996 8	47	658
128	339 4	16	224	384	1017 12	48	672
136	360 8	17	238	392	1038 16	49	686
144	381 12	18	252	400	1060 0	50	700
152	402 16	19	266	408	1081 4	51	714
160	424 0	20	280	416	1102 8	52	728
168	445 4	21	294	424	1123 12	53	742
176	466 8	22	308	432	1144 16	54	756
184	487 12	23	322	440	1166 0	55	770
192	508 16	24	336	448	1187 4	56	784
200	530 0	25	350	456	1208 8	57	798

For vessels from 56 to 100 tons add half a keel to the above calculations.

„ 100 to 300 do. adopt the figures in the table.

„ 300 to 400 do. subtract $\frac{1}{2}$ keel.

„ 400 to 800 do. subtract one to three keels, according to tonnage.

In case of ships regulated by the new register, a reduction of from 10 to 11½ cent
must be made from the above calculations.

Marwood.

STOWAGE OF GOODS.

ACIDS. Unless packed in sand in the hold, all dangerous acids, in carboys, ought to be stowed on deck, which should be shown on the bill of lading "with liberty to throw overboard for the safety of the ship, if deemed necessary." Underwriters object to the stowage of dangerous acids in the hold.

25 AFRICAN NUTS. Ships will not take more than one half to two-thirds of their register tonnage.

26 ALE and BEER in bottles should be stowed in the fore part of the ship, if passing into or through the tropics, because the temperature is always cooler there than in the main or after hold. Ale and beer should not be stowed near goods of a heating character such as coal, sugar, &c. as they create additional fermentation, besides which the dust from coal chokes the spiles of casks, and prevents the ale from relieving itself on the voyage. Casks and cases containing bottled ale are often very fragile, and will not bear the pressure of heavy goods; shippers therefore wish to have them stowed separately. Considerable pillage, both from casks and bottles, is sometimes carried on on board ship, and the vigilance of the officers is constantly required when loading and unloading. Casks of ale for southern voyages are sometimes spiled with rattan cane cut close. For stowage see also the articles casks, general cargo, and liquids.

27 The Shipping Gazette when asked whether underwriters were liable for loss arising from the breakage of bottles by frost in the Baltic, answers July 9, 1856, being insured "against the adventures and perils of the seas and all other perils, losses, or misfortunes, that have or shall come to the hurt, detriment, or damage of the said goods, or any part thereof," the underwriters must be supposed to have been aware of the nature of the risks which they assured, and the effects of those risks upon the cargo insured, they would therefore be liable to make good the loss—provided it were proved that the cargo had been properly packed and stowed.

24 doz. bottled ale or porter whether 24 cases of 1 doz. ea. 8 cases of 3 doz. or 4 cases of 6 doz. or 40 cubic feet, go to a ton for freight. ALLSOPP'S ales are packed in cases and casks containing 3, 4, and 6 doz. each; 32 doz. are said to go to a ton for freight. Irish ales and porters are usually freighted by the cask.

Ale, Beer, & Porter Measure. 4 gills make 1 pint; 2 pints 1 quart; 4 quarts 1 gallon; 9 gal 1 firkin; 2 firkins or 18 gal 1 kilderkin; 2 kilderkins or 36 gal 1 barrel; 3 kild or 54 gal 1 hogshead; 3 hhd or 108 gal 1 butt.

28 **ALKALI** or Soda Ash is injured by water, and if washed out will seriously damage every kind of manufactured goods; it should be stowed well off from the bilges. At Newcastle it is usually stowed on the ceiling or in the ends, according to the nature of the cargo.

Newcastle Alkali is packed in casks of 10 cwt. each; 18 tons are taken as being equal to a keel of coal or 850 cubic feet. At Calcutta and Bombay 20 cwt fossil alkali go to a ton. When wheat is 1s 5^p qr freight, soda and other alkalis should be, casks 6/10³ and bulk 4/7¹ 5^p ton; Mediterranean 4/9 5^p ton of 20 cwt.

29 **ALOES**. Four of the principal sorts are, the Socotrine, from the island of Socotra; the Hepatic, from Arabia; the Cabaline, from Barbadoes; and the Cape aloes, from the Cape of Good Hope and Melinda.

Bengal & Madras ton, 20 cwt nett, bags or boxes; Bombay, 16 cwt, kegs.

30 **ALUM**. At Bengal, Madras, and Bombay, 20 cwt go to a ton.

31 **AMBER GREASE** is usually found on the sea-coast of India, Africa, and Brazil, and supposed to be a concretion formed in the stomach of the Spermaceti whale. 20 cwt go to a ton at Bombay.

32 **AMMUNITION**. All lights and fires are extinguished when receiving or discharging gunpowder. In loading ammunition, use shot and empty shell for ballast, and keep them as much as possible in the body of the ship. A government officer recommends shot lockers to be carried up amidship; powder, live shell and rockets in magazines properly constructed. Judgment is also required as to quantity, for being generally in the bottom it tends to make a ship labour and strain. The Admiralty restrict the freight to two-thirds of the register tonnage.

33 The Horse Guards, Dec 14, 1855, strictly enjoin the avoidance of iron hoops or iron nails in the heading up of cartridge barrels, or the presence of iron or grit among the percussion caps, cartridges, or loose powder, if any should accumulate from broken cartridges taken out of the men's pouches; also the use of iron nails in fastening on cards of address.

34 Weight of shell, &c. in lbs, as issued for service by the Admiralty

Nature of shell	10-in	8-in	32-pr	24-pr
Weight of empty shell	77 ¹ / ₂	46	24	15 ¹ / ₂
Powder to fill shell for bursting ..	6 ¹ / ₂	2 ¹ / ₂	1 ¹ / ₂	1
Shell when filled with powder ..	8 ¹ / ₂	48 ¹ / ₂	25 ¹ / ₂	16 ¹ / ₂
Box to pack shell in	15	11	0	5
When packed for issue ..	99	59 ¹ / ₂	31 ¹ / ₂	21 ¹ / ₂

35 In the magazine of a merchant ship there have been found cases of powder, the steward's weights and scales, trunks, iron hoops &c, all together, to the manifest danger of every one. It is usual to build the magazine abaft the lazarette, although the great danger from fire is here; how often is it that provisions of every description are stored there, with a puncheon of spirits in the midst, notwithstanding that the daily consumption is drawn off by candle light? Magazines should be placed so that in the event of fire the powder can be got on deck ready for being thrown overboard; the crew will always have more confidence when they know it is not under them. See gunpowder.

36 **ANISEED** requires to be stowed secure from the attack of rats 50 cubic feet go to a ton at Bombay.

37 **ANNOTTO**, or arnotto, a species of red dye, formed of the pulp enveloping the seeds of the Bixer Orellana, a plant common in South America and the East and West Indies; it is made up at Cayenne in square cakes, weighing 2 to 3 lbs each, wrapped in banana leaves; in the Brazils it is formed into rolls of 2 or 3 oz. each. A case of annotto weighs nearly 2½ cwt. 50 cubic feet go to a ton at Bombay.

38 **ANTIMONY**, a metal shipped principally at Singapore; it is imported in the shape of ore, and commonly as ballast.

39 **APPLES**. In the United States, barrels of, are first perforated with holes for the admission of air, and also for the purpose of letting out water, in the event of the barrels getting wet; they are then stowed between decks, as near the hatches as possible, for the benefit of the air, bilge and cutline, with chocks between to keep them from working at sea. For conveyance to Liverpool they are frequently stowed on deck.

40 **ARANGOES** (beads). E.I.Co. 20 cwt. to the ton, Bombay same.

41 **ARROW ROOT** is a native of South America, but has long been introduced to the East and West Indies; it must be kept perfectly dry; the least damp will run through and spoil the whole contents of a box. 50 cubic feet go to a ton at Bombay.

42 **ARSENIC** is imported principally from Saxony and Bohemia. A cask weighs 4 cwt. 20 cwt. go to a ton at Bombay.

43 **ASHES**. Bone Ashes from the River Plate and the Brazils are dunnaged with bones covered with hides; they should be shipped perfectly dry to prevent spontaneous combustion. Pearl and pot ashes are also injured by water, and when wet will damage manufactured goods; dunnage 9 inches in the bottom and bilge, 2½ inches against the sides. 80 casks of pearl and pot ashes, weighing 16 tons, will occupy 850 feet or 1 keel. 20 cwt. potashes go to a ton at New York. A cask of American weighs from 3½ to 5 cwt; St. Petersburg cask 10 cwt; a barrel of potashes 200 lbs; 12 barrels make a last. When wheat is 1/4 ¢ quarter freight, ashes should be 1/2 ¢ cask.

44 **ASSAFÆTIDA**. E.I.Co. 20cwt, Bombay 50 cub.feet to a ton.

45 **AVERAGE CLAUSE**. The average clause in marine policies of insurance is as follows:—"Corn, fish, salt, seed, flour, and fruit, are warranted free from average, unless general, or the ship be stranded; sugar, tobacco, hemp, flax, hides, and skins, are warranted free from average under 5 per cent, unless general, or the ship be stranded; and all other goods, also the ship and freight, are warranted free from average under 3 per cent, unless general, or the ship be stranded." There is sometimes a variation in these per centages.

46 **BACON** should be kept as dry and cool as possible, and not stowed near dry goods which it will injure. Hams and bacon for the Australian colonies are stitched up separately in coarse sacking, and placed on the top of the cargo. Hams are often put in cases with oats to fill up, and sometimes in dry lime, which is said to preserve them most effectually. The freight of Irish bacon in bales is reckoned on the gross weight, which is generally stamped on the tallies attached to each bale.

47 **BALE GOODS** should be slung when hoisted in or out, and never suspended by sharp hooks. They should be stowed on their *flats* in midships, and on their *edges* in the wings, and should never be placed near sand ballast, or near any damp goods. Manchester bales, when screwed in hydraulic presses, are tightly fastened with iron bands riveted together; unless there are battens or thin splints of wood inside the bands, those parts between them swell out immediately the bale is relieved from the press, and are very liable to be injured by chafe. When a ship rolls from side to side, especially in boisterous weather, there is apparently a constant effort of the decks and beams to regain a horizontal position, and the doors, internal frame-work, paneling, and bulkheads, give evidence of this effort by creaking and sliding up and down every time the ship inclines. Similar movements prevail in the hold, and with the addition of those caused by pitching and tossing, the cargo is sometimes chafed. Unprotected bales are often injured, and then become a fruitful subject of dispute between the supercargo and consignee; they should therefore be well blocked off and firmly chocked. It is however desirable that bales intended for long voyages should have chafing pieces, or be otherwise protected from these unavoidable casualties.

48 All bale goods and all measurement goods are reckoned 40 cubic feet to the ton freight; if the weight exceeds the measurement, 20 cwt to the ton. Bales, packages, and cases, not weighing more than 15 cwt. to the cubic ton measurement, are designated as light freight. Cotton, hemp, and other screwed and pressed bales, are measured at Bombay as follows: the greatest length is first ascertained, then the bale is set on end, and cross measurements are taken at top, over the lashings, excepting the knots; an average of 100 bales is struck, by ascertaining the actual measurement of any ten bales, and proportionally—the shipper measuring one half, and the commander or ship's agent the other half, of the aforesaid quantity; the bales to be measured on the wharf or bunder, prior to shipment, if required, weather permitting. At Bombay 50 cubic feet go to a ton; at New York 40 feet of bale goods, of all kinds.

49 **BALLAST.** There is no specific rule for the quantity of ballast required for a ship; as a general rule, say half her tonnage, builder's measurement. Never take sand where stone is to be obtained; but if compelled to take it, adopt every means to prevent its entering the limbers or pumps, by protecting them with pitched canvas, matting, &c, and by caulking the ceiling, or covering it with old mats or sails. Some masters lay a trunk-way each side the keelson, to allow the water to run freely to the pump-well. When sand is shipped wet, allowance must be made for drainage, by bringing the vessel well down. To avoid the shifting of ballast, or even of coal, especially in sharp built ships, when bad weather is expected, the hold is sometimes fitted with ballast stanchions and boards. The lower ends of the stanchions are set in at the keelson, and the upper lashed to the beam, a few feet from the side; five or six on each side, with planks lashed or nailed fore and aft to the stanchions, 12 to 18 inches apart; the ballast is thus divided into three portions, which prevents the possibility of shifting; the stanchions for a ship of 300 tons should be about 8 inches. The use of flat wood stanchions, as wide as the beam,

may answer the same purpose, and leave more space for stowage. Sand or damp gravel should be covered with boards to receive bale goods; the dampness from sand will injure sugars or other similar goods in boxes, stowed on beds, in consequence of the settlement of the beds; it will crush and inevitably spoil lucifer matches, although stowed at a distance from it, and it stains the exterior of cases and casks—the hoops of which are oxydized by it; when dry it is often driven into bale sacking by the force of the wind, as the vessel rolls.

50 In some Colonial and other ports, sand only is to be had, and when in the tropics, it becomes so dry as to render the cargo on it quite unsafe, from the rolling and shifting which ensues; in this case it is necessary to make the sand more solid, by wetting it. Copper dross is sometimes used, its weight is advantageous, but it stains the cargo unless covered with plank; shingle or lead is better; the common buhr stone answers the double purpose of ballast and dunnage: for sizes and weights of iron ballast see iron.

51 BAMBOO REEDS. 3,000 or 16 cwt. go to a ton at Bombay.

52 BARILLA should have firm dunnage, such as oak staves, &c, say 9 inches in the bilge and 6 in the flat. Brushwood and fagots are sometimes used in Sicily and Spain, but they get compressed by the continued weight of the cargo, and endanger the safety of the ship. Barilla should be heaped up towards the hatches; a full cargo cannot be carried—say a little over three-fourths. 20 cwt. go to a ton at Bombay.

53 BARK should be dunnaged about 6 inches at the keel, and 10 in the bilge, sharp vessels less in the bilge; it must be well rolled down, for no vessel can take her tonnage of bark. 10 tons tree bark, or 8 tons coppice, will occupy 850 cubic feet or 1 keel; E. I. Co. allows 8 cwt. to the ton.

54 BDELLIUM, a gum resin, semi-pellucid, and of a yellowish brown or dark brown colour, something like myrrh in appearance. It is produced in Persia, Arabia, and India. Bombay ton 50 cubic feet.

55 BEAM FILLINGS. To stow these properly is one of the most important duties of the stevadore. When the cargo reaches from the ceiling up to the hold beams, it becomes necessary, with most descriptions of goods, to alter the stowage; by a little foresight, a sufficient quantity of suitable articles should be retained for this purpose. The great object is to avoid the loss of bulk between the beams, and to carry the fillings high enough to prevent the upper cargo from resting on them, or they will break, especially when rolling in heavy weather, and endanger the safety of the ship; two inches is considered sufficient for timber, other goods, not so compact, will require a greater height. The forecastle deck and the half-deck should not be overloaded with heavy goods.

56 BEES' WAX. 50 feet go to a ton at Bombay, 40 at New York.

57 BETEL NUT. A ship took a quantity into her main hold, and covered them with plank flooring; she then went to a second port in the East Indies, and placed bales on the planks. Although the nuts were perfectly dry when shipped, a vapour arose, settled against the under side of the hold deck, and fell in drops on the bale goods, which were rotten and worthless at the end of the voyage. 20 cwt. go to a ton at Bombay.

58 BILLS OF LADING. Before signing read them, and if in Great Britain, see that they are stamped (for signing an unstamped bill of lading a master is liable to a penalty of £50); never sign unless the goods are on board, or the bill of lading will be void. Where a mate's receipt has been given, have it returned previously. It is the duty of the master or mate to enter a correct account in the cargo-book of all goods received, and see that the bills of lading are in accordance therewith. When it is not possible to know weight, quantity, quality, &c, of goods received,

FOR	SAY
Freights in general,	Weight and quantity unknown.
Grain,	Quantity and quality unknown.
Bales of Hemp, Flax, and other packages,	Contents unknown, or weight and contents unknown.
A number of pieces, in bales, of manufactured goods,	Number of pieces & contents unknown.
Goods in bad order or apparently so	In bad order, or apparently damaged.
Heavy goods, such as lead, iron, tin, &c,	Weight unknown.
Goods received at a reduced rate as dunnage,	Shipped as dunnage.
Leakage goods,	Not accountable for leakage as well as quality, quantity and contents unknown.
Wines, spirits, and liquids,	Quality, quantity, & contents unknown, not accountable for leakage.
If the number of gallons are expressed in the Bill,	Number of gallons & contents unknown, and not accountable for leakage.
(Bottled goods,	Contents unknown, and not accountable for leakage and breakage.
Iron hoops, pots, camp ovens, &c.	Not accountable for rust.
Earthenware and glass,	Not accountable for breakage.
Sheep, cattle, horses, &c,	Not accountable for accidents and mortality.
In harbours of N. Zealand, Natal, Table Bay, or any other open bay, especially in the colonies unless extra freight be paid.	To be taken from ship's teakles at the risk and expense of the consignee.

59 Ordinarily all Bills of Lading, except for specie and bullion, have the words "weight and contents unknown" inserted in them.

60 Nothing should be received on board in a damaged state, without a note to that effect being inserted in the Bill of Lading, and a letter of indemnity from the shipper. It is no answer to say the goods are in the same order as when received on board. Shippers will seldom allow

the words "in bad order" to be inserted, and they are said to be of no protection to the master. A letter of indemnity leaves his remedy against the charterer only, and not against the consignee. The best way is to refuse all goods in bad order. Bales without chafing pieces should be so noted on the bill of lading. The master's copy of bill of lading ought to be signed by the shipper, and receipted by the warehousekeeper, or person authorised to receive the contents, on the delivery of the goods.

61 The Bill of Lading is the receipt of the master for the goods shipped on board, and his undertaking to deliver them at the port of discharge; being transferable by endorsement, from one person to another, it is essential that the master should be satisfied who is the possessor of the Bill of Lading before he delivers the goods represented by it.

62 On the faith of the master's signature to the Bill of Lading, the purchaser of the goods is induced to pay for them before they arrive at their destined port. The master or owner is responsible for the due performance of the bill of lading.

63 If not in opposition to the custom of the port, or where it can be so arranged, when goods are conveyed by boat, let them be at the shipper's risk until they are on board; and when a vessel is discharged in a river, roadstead, or bay, endeavour to let them be at his risk after going over the vessel's side. If goods are conveyed by lighter let them be brought to and taken from alongside at the risk of the shipper at port of loading, and at the risk of the consignee at port of discharge.

64 A master can demand to see the contents of a case, &c, if he suspects that it is damaged, or that it contains any unlawful or dangerous article, as gunpowder, &c. See articles damaged and dangerous goods.

65 Obtain written receipts for all goods delivered. For Bills of Lading for acids see the article acids, and for gold dust, precious stones, &c, the letter G; an Exchequer decision referred to there is entitled to the consideration of masters, as, under certain circumstances, it shews legal exemption from liability on other freights besides gold.

66 **BLACK LEAD.** Care should be taken, when rolling about casks in the hold, that the contents do not fall among sugar, rice, &c, which it will spoil. If black lead and oil are placed near each other, the oil will be wasted, and spontaneous combustion produced. At Ceylon the tare on plumbago is very great; agree for gross weight, if possible. A cask weighs about 11½ cwt; at Bombay 20 cwt. go to a ton.

67 **BLACK WOOD.** 50 cubic feet go to a ton at Bombay.

68 **BLEACHING POWDER** is chloride of lime made by exposing slaked lime to the action of chlorine; this article is of a corrosive and dangerous description, and will therefore injure other goods by contact. It is usually packed in casks containing 5 cwt. each, four of which go to a ton for freight.

69 **BONES.** 8 tons calcined, 12 ditto manure, &c, or 16 do best quality, all in bulk, will occupy 850 cubic feet or 1 keel. When wheat is 1/4 quarter freight, calcined bones should be 12/1½, manure 8/1, and best quality 6/0½, ¼ ton.

70 BOOKS. One extensive London publisher generally uses for exportation to America, strong deal cases, hooped with iron, 3 feet long, 18 inches wide, and 18 inches deep, inside measurement; they weigh 45 lbs, and hold 250 lbs weight of books; cases containing 30 cubic feet have been found inconveniently large; books for Australia are packed in cases lined with tin. Preference for stowage is given to the upper part of the main hold, midships, where the cases will keep dry, and the books be free from the jars and concussions of the bow and stern. See stationery. 40 cubic feet generally go to a ton freight; at Bombay 50 cubic feet.

71 BOOTS & SHOES, in trunks and cases, 40 feet go to a ton.

72 BORAX (Tincal). The E. I. C. allows 20 cwt. refined, 16 cwt. unrefined, to the ton; Bombay the same.

73 BOTTOMRY & RESPONDENTIA is a mortgage of the ship. The owner or master is, under certain circumstances, authorized to borrow money for outfit, or to purchase cargo for the voyage, pledging the keel or bottom (a part for the whole) in security for payment. In bottomry contracts it is stipulated, that if the ship be lost in the course of the voyage, the lender shall lose his whole money; but if she arrives in safety, the lender is then entitled to get back his principal and the agreed interest, however much it exceeds the legal rate. The extra hazard run by the lender has been held to justify his securing the highest rate of interest. Respondentia means money lent on cargo. The last of two or more bottomry bonds is first paid. When a laden vessel puts into an intermediate port for repairs, the master can bottomree ship, cargo, and freight, to raise money to pay for it. An English vessel cannot legally be bottomreed in England. Money for bottomry should be advertised for, and the lowest offer accepted.

74 BRAN. The Admiralty allows 48 bushels of bran or of pollard to a ton. In the Australian colonies the bushel is taken at 20 lbs—the ton being 2,000 lbs; freight in proportion.

75 BRAZIL NUTS abound on the Orinoco and in the Brazils.

76 BRAZIL WOOD, for dying, is plentiful at Pernambuco.

77 BREAD. Every particle of aqueous matter, without injury to it, is dried out of ship biscuit in the oven, and afterwards on kilns, &c, if properly manufactured, and it is thus rendered one-tenth lighter than the flour from which it was made; being so dry it will attract water in an extraordinary manner, and when once damp, decomposition spreads rapidly. If not kiln-dried, which is objectionable, some days should elapse after baking, to allow the oven steam to be well evaporated. Bread should not be shipped in wet weather, especially in bags, which quickly imbibe dampness, retain it, and communicate it to every bag near.

78 When loading with government provisions, it is customary to ballast with a sufficient quantity of beef and pork; dunnage with slabs over the casks, and at least four inches from the sides; fill up to the deck and stow close, to prevent the bags from chafing. Another authority says, bread as cargo should be the last article put into the ship, the sides of which should have thin boards, nailed upon good matting, fitted against them, and a casing should go round the masts, pumps, &c.

79 At Hamburg, some merchants nail inch boards against the sides, weather-board fashion. An experienced master recommends, that when loading all bread at that port, for Labrador, the ballast should be well dunnaged, not with straw or reed, which rots when wetted, but brushwood or broom stuff, &c; for the sides, feather-edge clap-board, $\frac{1}{2}$ in by 7, or $\frac{1}{2}$ or $\frac{1}{4}$ -in board, same width, which will sell for its cost. When there is space over the top tier, lay straw to catch loose drops from the seams of the deck.

80 Care should be taken not to stow bread on or near cordage, turpentine, or tar, coal tar especially. The ship's ceiling sometimes gets a coat of coal tar, but this ought to be avoided previous to loading bread, which should not go into a hold just cleared from a cargo of salt.

81 Manufacturers object strongly to the stowage of bread for ship's use, in bags, and recommend casks, or iron, with the inside tinned, or tinned cases, doubled, with highly-dried saw-dust, almost charred, between, and made to fit the shape of the ship. An experienced master objects to iron, on account of its liability to rust when bulk is broken, unless the case is emptied at once, and recommends air-tight rum puncheons, which contain from $3\frac{1}{2}$ to 4 cwt each : these are not used by some because the bread becomes impregnated with the taste of rum ; they prefer good charred air-tight casks. All unite in recommending bread to be kept perfectly dry. One master suggests that on long voyages, it should be stowed in the coolest locality, to lessen the attack of weevil and mite, and that store biscuit, so generally kept in the after hold, ought to be stowed forward. Another says, that when conveying troops to Australia, their bread, in bags, continued sweet to the termination of the voyage, because it was all stowed together in a suitable place, while that of the crew became damaged, the casks having been placed promiscuously with those containing water, beer, provisions, &c. See the articles bricks, general cargo, passengers, &c.

120 bags bread, 112 lbs each, 6 tons, will occupy a space of 850 cubic feet, or 1 keel. The Admiralty allows 6 bags of 112 lbs net, in bags, and 5 bags in casks, to a ton. At New York 6 cwt. in casks, 7 cwt. in bags, and 8 cwt. in bulk, is allowed to a ton. When wheat is 1s $\frac{1}{2}$ quarter freight, bread should be $9\frac{1}{2}$ d $\frac{1}{2}$ bag. The Admiralty allows 500 biscuit bags, pressed, 700 $\frac{1}{2}$ ditto, or 200 meal sacks, to a ton for freight. For the purpose of changing stocks in bond, the 5th & 6th Vict. cap 92, proportioned for every 96 lbs of kiln-dried wheat, or for every 100 lbs of wheat, not being kiln-dried, not less than 78 lbs of fine wheat flour, or 68 lbs of captain's biscuit, or 80 lbs of biscuit of the standard of the biscuit supplied to H.M. Navy, or 118 lbs common ship biscuit.

82 BRICKS. It is usual in London to purchase bricks to be shipped free on board ; they are consequently stowed in the hold, in tiers, by men accustomed to it ; if a large quantity they should be placed in the middle of the hold, if possible. A ship cannot carry a full lading. Bricks will readily absorb $1/15$ th of their weight in water. When making a voyage from Hamburg to Labrador, it is usual to take with the bread and provisions, a few thousand bricks for ballast ; they should be as dry as possible, otherwise the heat of the hold will cause them to give out a steam, which, coming in contact with the cold decks and sides, will, especially if they are varnished, condense, and fall in drops, or run down the sides, and damage the bread. It is desirable to have a ground tier of

barrels of pork and beef and flour, with firkins of butter for broken stowage, which will keep the bread off from the bricks.

7,000 fire bricks or 8,000 common bricks, also tiles, weigh 21 tons and measure 638 cubic feet, or $\frac{3}{4}$ keel. One unburnt London brick is 10 inches long, and 5 inches broad; a burnt brick is 9 inches long, $4\frac{1}{2}$ wide, and $2\frac{1}{2}$ thick, and weighs about 4 lb 15 oz. 450 stock bricks weigh 1 ton, and there are 500 in a load; 1,000 London stock bricks weigh about $2\frac{1}{2}$ tons; 1,000 Jersey bricks $2\frac{1}{2}$ tons, and 1,000 Fareham, Southampton, &c, 3 tons. 1,000 fire bricks weigh $3\frac{1}{2}$ to 4 tons. A Glasgow fire brick is $9\frac{1}{2}$ in. long, $4\frac{3}{4}$ in. broad, and 3 in. thick, and weighs $8\frac{1}{2}$ lbs.

83 BRIMSTONE or Sulphur, requires say 6 in. dunnage in the flat, and 9 in the bilges. It should be kept as high as possible; as it falls into the hold there let it lie, excepting the necessary trimming off to prevent shifting and thus avoid labouring and straining at sea. A full cargo cannot be taken, say a little over three-fourths. It is spoiled by contact with oil, which it will attract from casks to its great injury. In general cargoes, it should be kept as far as possible from saltpetre, nitrate of soda, charcoal, and all goods liable to spontaneous combustion, for should fire break out and communicate with the brimstone, its suffocating vapours will prevent all efforts to extinguish the fire. Igniting lucifer matches where brimstone may have penetrated, and smoking tobacco below, are highly dangerous.

84 BRISTLES, a cask weighs 10 cwt.

85 BUFFALO HORNS, 16 cwt. go to a ton at Bombay.

86 BUTTER should be stowed as low down as possible for the sake of coolness: it will not however bear much pressure.

In Ireland generally it is packed in firkins, but in Belfast a fresher quality is packed in crocks; for freight 32 firkins are reckoned to a ton — 55 on an average weigh 2 tons. 530 firkins butter, 70 lb each, $16\frac{1}{4}$ tons, will occupy a space of 850 cubic feet or 1 keel. When wheat is 1s $\frac{1}{2}$ qr freight, butter should be $1\frac{1}{4}$ d $\frac{1}{2}$ firkin. A firkin of English weighs 56 lb, Irish about $\frac{3}{4}$ cwt, tare 14 lb, net weight about 70 lb, a tub 84 lb, a barrel 2 cwt, and a Dutch cask 1 cwt.

87 CAKE LACK. E.I.Co. 16 cwt. to a ton. Bombay same.

88 CAMBOGEUM. E.I.Co. 20 cwt. to a ton.

89 CAMPHOR is made up at Canton in chests, drums, and casks; a box weighs about 1 cwt. E.I.Co's ton, 15 cwt; Bombay 50 cubic feet.

90 CAMWOOD is principally obtained from the vicinity of Sierra Leone, and, being extremely dry, should not be stowed near palm oil, which it will draw through the casks.

91 CANDLES should be stowed in a cold dry part of the hold, and the boxes carefully placed on their bottoms, or the candles will be broken. When packing for warm climates, paper ought to be placed between each layer. For conveyance coastwise, they are usually packed 12 doz. lbs in a box; for the navy, in boxes containing 56 lbs and 112 lbs; for the North American colonies 50 lbs. Admiralty allows 100 doz. to the ton.

92 PRICE'S Patent Composite Candles, for the Home-trade, are usually parcelled in paper wrappers, 6 lbs each, and packed in corded boxes, containing from one to sixteen dozens of pounds, the candles in

the packages being protected by a small quantity of straw, where any vacant space occurs, and a layer at the top. For shipments to some of the outports, hogsheads and puncheons are occasionally used, the small-sized paper parcels, and mode of filling with straw, being observed, as when packing in boxes.

93 For exportation, small cases, containing 25 lbs to 28 lbs each, are substituted, the candles being wrapped in six-pound parcels. For the East India market they are usually placed in single pound papers, as being more eligible for sale there; these cases do not require any straw, as they are made to fit the bulk of the packets as closely as practicable; for the West Indies, puncheons and hogsheads, as well as small cases, are used. To compete with the packets which are imported into those markets by foreign makers, and which represent the English pound packets, but contain 14 oz. only *avoirdupois*, the Company put up their Belmont Sperm Candles, in packets of two sizes, containing 12 and 16 oz. nett weight, English *avoirdupois*, which packets bear a label stating their weight and contents. Twenty-five of these 16 oz. packets would pack in a case of nearly the same cubical dimensions as the 25 lbs cases referred to. PRICE'S candles, made expressly for the export trade, require little care for choice of place for stowage, as from their hardness they are not affected by increase of temperature, when placed in the upper tier of a ship's cargo.

94 CANELLA ALBA, the inner bark of a tree growing in the West Indies, exported in casks and cases, in long pieces, some rolled in quills and others flat; the quilled is considerably thicker than cinnamon, and the flat nearly $\frac{1}{4}$ of an inch thick. The quilled is yellow both sides, the flat yellow outside and pale brown within.

95 CANES. 3,000 (16 cwt.) go to a ton at Bombay.

96 CANTHARIDES or Spanish Fly, an insect found on a variety of shrubs in Spain, Italy, France, &c. those used in Great Britain are imported partly from Sicily, but principally from Astracan, packed in casks and small chests; they should be kept from the air.

97 CANVAS must be kept free from liquids, moist goods, or dampness of any kind, as it is liable to injury from mildew; salt water stains it, and injures its appearance. Sailcloth should also be kept off from metals of all descriptions, or packages and casks, iron-bound, which will chafe it, and the iron moulds will cause it to rot.

The length of a piece or bolt of British sail-cloth, as required by law, is 38 yards; and breadth 24 inches. Every piece or bolt, 24 inches wide, should contain at least 560 double threads of yarn. Weight double threads, No. 1, 44 lb; 2, 41 lb; 3, 38 lb; 4, 35 lb; 5, 32 lb; and 6, 29 lb. Single threads, No. 7, 24 lb; 8, 21 lb; 9, 18 lb; and 10, 15 lb. For freight, 60 pieces Baltic sail-cloth are equal to $\frac{2}{3}$ of a ton of clean hemp.

98 CARDAMOMS, seed capsules. E.I.Co. allows 12 cwt. to the ton, Bombay 50 cubic feet.

99 CASHEW NUTS are externally of a greyish or brownish colour, of the shape of a kidney, somewhat convex on one side and depressed on the other; the shell is hard, and between it and the kernel there is lodged a thick blackish inflammable oil, very caustic in fresh nuts.

100 CASKS. In hoisting all casks, such as hogsheds, puncheons, pipes and butts, containing spirits, oil, or any other liquid, use chain or rope slings if possible, and not can-hooks. In stowing let them be carefully bedded and quoined, use the slice in preference to the crow-bar; see that the bung-holes are all up, bilge free, and heads clear. The beds should be thick enough to keep the bilge clear when placed near the heads, commonly called the quarters, which is their proper position, being the strongest part of the cask. Let the chimes meet so that the chime of one cask shall not work into the head of the next. In some trades the same casks are used voyage after voyage, and are lime washed every time, until they are covered with a crust which conceals the condition of the staves, hoops, and heads; before shipping these, masters should have them scraped and surveyed, to avoid leakage and waste, and prevent loss of freight and disputes at the port of discharge. **BRADY** says, "Strike down the beds of casks, place and whitewash them; commence stowing in the after bulkhead in the hold, the largest casks in the kelson tier, and the guages on each side to correspond. After completing the first tier go on with the second, placing hanging beds between the casks, and stowing bark wood in all the breakages; as the tiers approach the wings let the size of the casks diminish." See general cargo, wines, &c. The bulk of a barrel is taken as cubic feet; 8 barrels bulk being one ton bulk; the general rule for finding the content for stowage of a cask is to multiply the bilge diameter by itself, and the product by the length; from the result subtract one-fifth of itself, the remainder is the content of the cask. For the government rates of freight for casks, staves, headings, packs, hoops, &c, see Admiralty tables 2 and 3, where they are set forth very elaborately. Irish beer casks are not of the full contents, and contain 52, 32, and 16 gal respectively; the freight is computed at 12 kilderkins, 6 barrels, or 4 hhd $\frac{1}{2}$ ton.

SUNDRY CASKS.

	Length		Breadth		Capacity
	ft.	in.	ft.	in.	
Port pipé ...	4	10	2	10	113, 116
Do hhd	3	1	2	6	56, 58
Sherry butt..	4	2	2	11	108, 112
Do hhd	3	2	2	4	54, 56
Marsala pipe	5	5	2	8	90, 96
Do hhd	3	5	2	1	45, 48
Brandy pipe	4	4	2	10	114, 118
Do hhd	3	4	2	4	57, 59
Rum punch.	3	6	3	0	90, 96

ADMIRALTY CASKS.

	Length		Diam.		Capacity
	in.	in.	in.	in.	
Leager	59		38		164
Butt	53		33		110
Puncheon	41 $\frac{1}{2}$		30		72
Hogshead	37		28		54
Barrel	31 $\frac{1}{2}$		24 $\frac{1}{2}$		36
Half hogshead...	28		22 $\frac{1}{2}$		27
Kilderkin	25		19 $\frac{1}{2}$		18
Firkin	22		17		12

101 CASSIA from Malabar is thicker and darker than that of China, and more subject to foul packing; each bundle should be separately inspected. A chest weighs 60 lb. E.I.Co, allows 12 cwt buds or bloom to a ton, and 8 cwt lignea; at Bombay 50 cubic feet; at Calcutta a ton in cases weighs about 5 cwt and measures 50 cubic feet; when taken at 10 cwt which is sometimes done, the rate of freight should be increased in proportion; Singapore should be taken at 50 cubic feet.

102 CATTLE require a level footing of ballast in the hold, and their heads should be well secured to the sides by head ropes and ring bolts. Horse boxes, or good wide canvas belly-bands, should be used for landing, especially in stormy weather.

103 CEYLON STONES; 20 cwt go to a ton at Bombay.

104 CHARCOAL. Care should be taken to prevent animal charcoal from choking the pumps; it will readily absorb 20 per cent of its own weight, and soon cause a ship to founder at sea. Avoid the shipment of wood or peat charcoal recently made, as it is liable to spontaneous combustion simply from access of the atmosphere in a warm moist locality, without the admixture of oil or other liquids.

105 CHARTER PARTY. There are no fixed forms for Charter parties. Under the articles grain, guano, oranges, pilchards, &c, the forms used for those articles are attached. The instrument generally shews the ship's register tonnage, and sets forth the terms upon which the owner or master engages the ship, and the freighter or charterer takes her. It may be on plain paper, stamped afterwards. When at home, it is usually signed by the owner and the charterer; abroad, by the master and the agent for the charterer. The master's signature at home is equally binding, if acting under instructions from the owner.

106 Should the ship not be ready for sea by the appointed time, or should the charterer not be ready with the freight, an action for damages may be brought by the injured party.

107 The master will only take as much as his ship can conveniently carry, although the charter party may say a full and complete cargo. On the other hand, some merchants to protect themselves when chartering a "full cargo" insert the words "warranted register tons or thereabouts, thereabouts meaning fractional parts only." Otherwise a ship may be described as 250 tons register or thereabouts, and prove of 300 tons, and thus carry 150 or 200 tons more than the merchant has cargo to ship, and yet he is bound to provide the extra quantity or suffer the loss. The custom of the port will often regulate the reception and discharge of cargoes; some information on this, and on other subjects connected with chartering, will be found under bills of lading.

108 Where a ship is detained beyond the number of lay-days specified in the charter party, the master should give a notice of demurrage daily, if possible, including Sunday on Saturday's notice. This applies both to loading and unloading.

109 At a foreign port of loading, a protest must be noted. At home, within twenty-four hours after arrival, it is usual to note a protest "against wind and weather," to cover any damage which may be found in the cargo; this protest can be extended when the nature of the damage is ascertained.

110 CHEESE. Dutch cheese is frequently injured through insufficient flooring; it should not be stowed more than two deep, on suitable platforms; ships not fitted for its stowage in bulk should be provided with a platform for the ground tier. 1,000, ten hundred, weigh about 38 cwt. They are usually freighted by the lump with other goods; freighting by the lump secures to the charterer the opportunity of having them well ventilated. A ship will not stow her register tonnage of Dutch cheese. American cheese is very liable to become heated through improper stowage. Small Cheddar, from 9 to 12lb, for Australia, should be

carefully packed in cases, say six in each; if possible, each cheese should also be covered with tin, or some other mode adopted, to protect it from rats. Cheese is sometimes enclosed in skins, but this is no protection from vermin. All kinds should be kept off from damp goods or vapour goods. 20 cwt. go to the ton.

Cheese or Butter. A clove or half stone 8 lb; a stone 16 lb; Suffolk way 32 cloves or 256 lb; Sussex 42 cloves or 336 lb.

111 CHASSUM; 10 cwt go to a ton at Bombay.

112 CHERANG; 20 cwt go to a ton at Bombay.

113 CHINA ROOT comes from the West Indies as well as China. E.I.Co. allows 11 cwt to the ton, Bombay 50 cubic feet.

114 CHLORIDE OF LIME, or bleaching powder, is soluble in water and liable to decomposition from heat and moisture. As the gas evolved from it corrodes metals rapidly, and has an energetic action on all vegetable substances; the greatest care should be taken when stowing with a miscellaneous cargo, for a long voyage, that it be properly packed, *i.e.* preferably in stone jars, but at least not in dry but in close casks well hooped with wooden hoops.

115 CIDER for warm latitudes is best in small packages. A pipe contains 100 to 118 gal. For stowage see ale, beer, casks, and liquids.

116 CINNABAR. A mineral substance. E.I.Co. allows 16 cwt. to a ton, Bombay same.

117 CINNAMON. Ceylon bundles weigh about 80 lb; they are stowed closely, and the interstices sometimes filled with black pepper, to prevent the flavour from evaporating. A bale weighs about 92½ lb. 6 cwt. in bales, and 50 cubic feet in chests go to a ton at Bombay, E.I.Co. 8 cwt.

118 CLAY, like other heavy materials, should lie on the floor fore and aft, and be raised to a point at the main hatchway, decreasing towards the bow and stern. 20 cwt. go to a ton; in some ports more.

119 CLOTH. In the tables of tonnage, Nos. 2 and 4, will be found the Admiralty allowance for tonnage for cloth coats, jackets, trowsers, great coats, flannel, serge, stockings, blankets, shirts, palliasses, bolsters, sheets, towels, &c. page 19.

120 CLOVES readily imbibe moisture if stowed near any liquid; in the Dutch settlements they are made up, the best in chests, inferior in bags. A matt weighs 80 lb, a chest 200 lb. At Bombay 50 cubic feet in chests, and 10 cwt. in bags go to a ton. E I.Co. 12 cwt; clove bark 8 cwt.

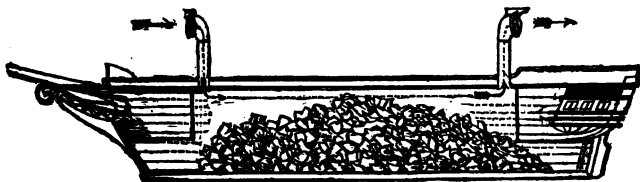
121 COAL. Ships sail best when coal is heaped up towards the hatchways in a line corresponding with the direction of the keelson; small vessels however cannot afford to lose any space. With 'tween decks, the lower main hatches are left open to replenish the hold, as the cargo settles. At Cardiff, mates should keep a very exact account of the number of the waggons and barges, so that they may be satisfied as to the weight and quality shipped, by referring to the documents which accompany the trains and canal boats. The large coal naturally falls away to the wings, and in loading, a quantity of small is produced, and is often found immediately

under the hatchways; this obstructs the approach to the large, however much there may be, and the consignee possibly declines to receive the cargo until the dust is thrown on deck; the consequent delay might be avoided by trimming off the small at the loading port. For loading, see also ballast, general cargo, and glass.

122 Coal is subject to danger of two kinds, totally different, although often confounded together; one is from spontaneous combustion, and the other the liability of ignition and explosion of the gas evolved from coal, and remaining in the ship.

123 **SPONTANEOUS COMBUSTION.** Any coal containing a large quantity of iron pyrites is apt to heat when saturated with water, and after some time to burst into flame. The only prevention is said to be to keep the coal dry. Some kinds of coal are free from iron pyrites, and therefore not subject to spontaneous combustion.

124 **IGNITION.** Every kind of steam and other coal, especially when rapidly transferred from the mine to the ship, gives out carburetted hydrogen gas or fire-damp, which is explosive when mixed with atmospheric air, on the application of flame. This gas is peculiarly light, and is considered most explosive when mixed with nine times its volume of atmospheric air; with twelve times it will not ignite. If the hatches are fastened down directly the cargo is received, which is frequently done to keep out the rain or cold, or to prepare for sea, the gas finds its way through the coal to the spaces under the deck, and penetrates through the bulk heads into the lazarette, cabin, and forecabin, and when a match is lit, or a lighted candle exposed, especially in the lazarette, an explosion may take place and damage the decks, and jeopardize the lives of the crew. To avoid this, keep the hatches open 24 or 36 hours, on all occasions, but especially when bound on long voyages, particularly to the Southward; let two funnels, of 12 or 15 inches diameter, with moveable tops, be placed one forward the other aft, communicating through the deck with the hold; keep a vacant space between the cargo and the beams. Turn the top of one funnel to the wind, the other from it, a current of air will then conduct the explosive gas harmlessly out of the ship; this is said to be an effectual remedy.



125 Excepting the Aberdare Valley and some other sorts, which are free from iron pyrites, brassy coal and steam coal, especially when damp, are, according to their chemical properties, more or less liable to spontaneous combustion, and when coals from different pits are mixed, the danger is said to be increased.

126 It has been also suggested that coal may be ventilated by building, with large lumps, two shafts communicating below; one with a wind-sail would act as a down-cast for fresh air, the other as an outcast for foul air.

127 Every ship laden with this class of combustible goods ought to have a safety lamp for exclusive use in the lower hold, and under the cabin floor. Few accidents occur except where neglect and ignorance are generally traceable.

128 Gas coal, being smaller, will stow 3 or 4 ϕ cent more than ordinary house coal, from the same pit. In the delivery of a large quantity of Newcastle gas coal at a channel port, the discharge has been 3 ϕ cent more than the quantity invoiced. Newcastle Cannel coal stows and turns out the same as house coal. Glasgow cannal stows 10 ϕ cent less than Newcastle house coal. 11 tons of Coke will occupy the same space as 21 ton 4 cwt, or 1 keel of Newcastle coal.

At Newcastle and the North of England 20 cwt or 10 large sacks contain one ton; 21 ton 4 cwt 1 barge or keel; a keel consists of 8 waggons of 53 cwt or 126 cubic feet each, and is therefore 1,008 feet, but when compressed in the hold will stow in a space of 850 cubic feet, which is at the rate of 40 feet per ton; by the same rule 14.96 ton of coal make 15 ton bulk, thus shewing that the weight and bulk of coal is nearly equal. A chaldron is 53 cwt. In Wales the ton of 20 cwt is only used. At New York 29 bushel of sea-coal go to a ton. When wheat is 1/. per quarter freight, coal should be 4/7 per ton.

SPECIFIC GRAVITY OF VARIOUS KINDS OF COAL.

Average 36 samples, Wales...	1.315
... 18 do Newcastle .	1.256
... 28 do Lancashire	1.273
... 8 do Scotland...	1.259
... 7 do Derbyshire	1.292

Haswell Wall's End	1.28
Newcastle Hartley	1.29
Hedley's Hartley.....	1.31
West Hartepool Main	1.26
Hasting's Hartley	1.25
Davison's Hartley	1.25
Derwentwater Hartley	1.26
Broomhill	1.25
Cowpen and Sidney's Hartley	1.26

FOREIGN COAL.

Borneo (Labuan kind)	1.28
... 3-feet seam	1.37
... 11-feet	1.21
Formosa Island	1.24
Conception Bay	1.29

STEAM ENGINE COAL.

<i>Welsh</i>	Anthracite	1.375
	Ebbow Vale	1.275
	Binea	1.304
	Duffryn	1.326
	Pentrafin	1.358
	Graigola	1.30
	Pontypool	1.32
	$\frac{3}{4}$ Rock Vein	1.84
	Coleshill	1.29

<i>Scotch</i>	Dalkeith Jewel Seam	1.277
	Do Coronation Seam	1.316
	Wallsend, Elgin ...	1.20
	Fordel Splint	1.29
	Grangemouth	1.29

<i>English</i>	Broomhill	1.25
	Parkend, Syding, } Forest of Dean }	1.283

<i>Irish</i>	Slieveadagh	1.59
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In page 29 there is a table showing the number of chaldrons, tons, or keels, a vessel will carry at the rate of 14 tons per keel.

NEWCASTLE STANDARD COAL MEASURE CONVERTED INTO WEIGHT.

Ch.	Ton cwt	Ch.	Ton cwt	Ch.	Ton cwt	Ch.	Ton cwt	Ch.	Ton cwt	Ch.	Ton cwt
1	2 13	18 47 14	35 92 15	52 137 16	69 182 17	86 227 18					
2	5 6	19 50 7	36 95 8	53 140 9	70 185 10	87 230 11					
3	7 19	20 53 0	37 98 1	54 143 2	71 188 3	88 233 4					
4	10 12	21 55 13	38 100 14	55 145 15	72 190 16	89 235 17					
5	13 5	22 58 6	39 103 7	56 148 8	73 193 9	90 238 10					
6	15 18	23 60 19	40 106 0	57 151 1	74 196 2	91 241 3					
7	18 11	24 63 12	41 108 13	58 153 14	75 198 15	92 243 16					
8	21 4	25 66 5	42 111 6	59 156 7	76 201 8	93 246 9					
9	23 17	26 68 18	43 113 19	60 159 0	77 204 1	94 249 2					
10	26 10	27 71 11	44 116 12	61 161 13	78 206 14	95 251 15					
11	29 3	28 74 4	45 119 5	62 164 6	79 209 7	96 254 8					
12	31 16	29 76 17	46 121 18	63 166 19	80 212 0	97 257 1					
13	34 9	30 79 10	47 124 11	64 169 12	81 214 13	98 259 14					
14	37 2	31 82 3	48 127 4	65 172 5	82 217 6	99 262 7					
15	39 15	32 84 16	49 129 17	66 174 18	83 219 19	100 265 0					
16	42 8	33 87 9	50 132 10	67 177 11	84 222 12						
17	45 1	34 90 2	51 135 3	68 180 4	85 225 5						

129 COCCULUS INDICUS, Indian Berry or Levant Nut. At Bombay 12 cwt. go to a ton.

130 COCHINEAL, being extremely dry, should be stowed at a distance from liquids, which it will draw through the cask; from Central America, it is brought in untanned hides, each with its contents weighing about $1\frac{1}{2}$ cwt, and called a seron. There are 70,000 insects in one pound; a seron sometimes weighs 140 lb; a bag is about 200 lb. A Bombay ton is 50 cubic feet; E.I.Co. 20 cwt.

131 COCOA in bags requires to be dunnaged in the bottom 9 in, bilge 14 in, sides $2\frac{1}{2}$ in. A bag weighs about 1 cwt, a cask $1\frac{1}{2}$ cwt. A ton at Bombay 12 cwt, New York 1,120 lb in casks, 1,307 in bags, 16 cwt. in bulk.

132 COCOA OIL. At Bombay 50 cubic feet in casks go to a ton

133 COQUE DE PERLE. A Bombay ton 20 cwt. in bags.

134 COFFEE in bags requires to be dunnaged in the bottom 9 in, bilge 14 in, and sides $2\frac{1}{2}$ in, and should always be shipped in double bags; when single they will not bear handling; the dunnage should be well covered, so as to save the coffee in case the lower tier of bags should be burst by the pressure from above. The berries readily imbibe exhalations from other bodies, guano especially, and thereby acquire an adventitious and disagreeable flavour; sugar placed near coffee will in a short time so impregnate the berries and injure their flavour as to lower their value ten or twenty per cent. Dr. MOSELEY mentions that a few bags of pepper on board a ship from India, spoiled a whole cargo of coffee. It is sometimes shipped at Rio Janeiro in the same hold with hides, which are occasionally used for dunnage. The coffee often gets heated, and if the evil is increased by deck leaks and putridity among the hides, the whole cargo will be damaged. Coffee in a green state is very liable to ferment.

135 In the West Indies, coffee alone is dunnaged with 8 or 10 inches of logwood, carefully covered with mats or old sails; in bags it should have staves or matting all up the sides.

40 tierces coffee, 7 cwt. each, weighing 14 tons, or 230 bags $1\frac{1}{2}$ cwt. each ($17\frac{1}{2}$ tons) will occupy 850 cubic feet or 1 keel; E.I Co. 18 cwt to a ton; Bombay 14 cwt; at Ceylon 18 cwt in bags or 16 cwt in casks; at New York 1568 lb in casks, 1,880 in bags, or 16 cwt in bulk. When wheat is freighted at 1/. per quarter, coffee in tierces should be $6/11\frac{1}{2}$ per ton, in bags $5/7\frac{1}{2}$. A barrel of coffee weighs 1 to $1\frac{1}{2}$ cwt, a bag $1\frac{1}{2}$ to $1\frac{1}{2}$ cwt, and a tierce 5 to 7 cwt. A Mocha robin 1 to $1\frac{1}{2}$ cwt, a Mocha bale 2 to $2\frac{1}{2}$ cwt.

136 COIR. Bombay ton coir rope 10 cwt. or 50 cubic feet.

137 COKER NUTS are almost always used as dunnage.

138 COLOCYNTH or bitter cucumber. Bombay ton 50 cubic feet in chests, 6 cwt. in bags.

139 COLOMBO ROOT. Bombay ton 12 cwt. in bags. E.I.Co. 16 cwt.

140 COMBUSTION, (SPONTANEOUS) It is too commonly supposed that cases of fire are almost always traceable to the intentional or accidental access of fire to inflammable substances. The accompanying list of substances liable to Spontaneous Combustion, without any application of heat, will shew that greater danger is to be apprehended from these bodies than from the taking fire of ordinary inflammable substances.

141 Little more is necessary for the prevention of fire on board ship, or for the control and extinction of it, when it has broken out, than a careful and judicious application of the few simple principles involved in the theory of combustion.

142 Two distinct classes of bodies are necessary for the production of fire, viz:—combustibles and supporters of combustion. Atmospheric air is the most common supporter of combustion. When wood burns, its constituents, carbon and hydrogen, combine with the oxygen of the air, and produce water and carbonic acid, both of which substances are destroyers of combustion.

143 Bearing these facts in mind, they should be thus applied. A fire has broken out in the hold of a ship, in a part quite inaccessible. Fire cannot continue without a constant supply of air, therefore use the utmost diligence in stopping every hole and crevice through which air can obtain access to the combustible, and prevent as much as possible the passing off, of the smoke produced, because it contains carbonic acid, which is even a more active extinguisher of fire than water itself. On board steam-ships, a pipe, accessible from the deck, should if possible be laid on, from the boiler, to communicate with every part, and furnished with cocks or valves, by which the steam could be directed wherever it was required. In case of fire, the locality should be closed as completely as possible, and a supply of steam turned on, to expel the atmosphere quickly. As the air is as absolutely necessary for combustion as the combustible, its removal will be as efficient for the extinction of fire as would be that of the combustible itself.

144 Some bodies, such as gunpowder, nitre, and saltpetre, contain within themselves the elements of combustion, they should therefore be stowed apart from other combustible bodies, and arrangements made for quickly drowning them with water supplied through a pipe leading directly from the deck. With such ready means of preventing danger from explosion, the confidence of the crew may be maintained, and the necessary efforts continued for the extinction of the fire.

145 For the development of spontaneous combustion in any of the bodies contained in the annexed list, heat, moisture, and atmospheric air must be present together. If oil and cotton get together, and atmospheric air have access to them, spontaneous combustion will not commence until moisture be present, and a certain temperature, say 60° be attained. If more water have access, any inclination to increase of temperature will be neutralized by the water dispersing the heat through surrounding bodies. If excess of water be not present, the temperature will go on increasing, provided the atmosphere be stagnant; but if there be room for rapid ventilation, the increase of temperature will be prevented by the heat being carried off in the vapour produced, but removed by the stream of air. See coal, fermentation, hay, oil, vapour damage, ventilation, wool, &c.

146 Capt. SEDGWICK recommends that when fire occurs in the hold, a recorded number of augur holes should be bored in the gun room or forecastle, until the water is level with the beams; one hatch only to be kept open, two will admit a draft and create flame; throw in water daily. When the danger is over plug all the holes. If bad weather prevails, close every aperture, as a fire may be thus kept smouldering for weeks. Another plan is to bore holes in the deck, over the suspected place, nearly through; plug the scuppers, &c, and fill the deck 6 or 8 inches with water. Then finish the holes, and keep them supplied with water; plug them immediately the supply fails or the danger is over. Prepare boats with provisions, in all cases.

147 A list of articles liable to spontaneous combustion, either

By the absorption of moisture, Barilla, black ash waste, bones, bone dust, Charcoal wood, do peat, chocolate, chicory roasted, coffee do, corn, cotton cloth, cotton raw, ditto waste, Fibrous vegetable and animal substances of every description, flax, flour, Guano, Hay, hemp, Lamp black, lime, Oakum, oatmeal, old rags with oil and moisture or without oil, Paper, peat, Rope, Sawdust, Woollen cloths.

By decomposition, Brassey coal or coal brasses, or iron pyrites in coal used for making copperas, Copper pyrites or sulphurous copper ore, cloth, woollen, or cotton, with moisture or with oils and moisture, Fireworks, Iron pyrites, iron recently raised from long continued submersion in salt water, Linseed meal, lucifer matches by friction or concussion (fires have been occasioned by rats gnawing wax vestas or lucifers), Oil cake, oils, vegetable or animal, and fats with any vegetable fibre, moisture, and slight heat, are sure to take fire, oil cloth, Paints, printing ink, pictures, i.e. oil paintings, Wipings, i.e. cotton waste, which is commonly employed for the purpose of cleaning machinery, or any other cotton, flax, hemp, or woollen, waste cloth or fibre that may have been used for wiping off the oil and dirt from machinery, is peculiarly dangerous; wood, sawdust, and other combustible bodies, are

commonly supposed to require flame for ignition, or at least a very high temperature, but a close atmosphere, with a temperature of less than 180° Fah. long continued, is sufficient to cause spontaneous combustion. Or

By the evolution of gas, Coal bituminous, some sorts are peculiarly liable to evolve a combustible gas which does not take fire spontaneously, but which, having access to a lighted candle or fire, will ignite, and explode with sufficient violence to blow up the decks. Guano taking moisture will evolve gas in sufficient quantity to risk an explosion. Vapour of spirits, such as brandy, rum, whiskey, pyroxylic spirit, naptha, turpentine, camphine, &c, like gas, is liable to take fire at a considerable distance from a broken or opened vessel containing them, and consequently of course, to set fire to surrounding bodies.

148 COPPER, pure, is made up at Swansea in ingots of 14 lb and cakes 20 to 50 lb. Schooners of 80 tons register and 130 burthen, with a hold 11 feet 3 in. deep, and drawing 11 feet, are provided with three kelsons, 5 feet high, to support a platform on which the copper is stowed, amidships, as high as possible, to prevent the vessel from labouring; sharp vessels in winter, require the copper to be laid right across, and to avoid shifting, spare rope, warps, mooring chains, &c, are placed over all; sheathing copper is made up in cases containing 5 to 10 cwt each; dunnage on the ceiling, as salt water injures its appearance. See metals.

21 Cwt. copper is sometimes taken as a ton. E.I.Co. allows 20 cwt. Japan copper to the ton. When wheat is 1s. per quarter freight, copper should be 4/9 per ton of 20 cwt.

149 COPPER SULPHATE or blue vitriol is soluble in water and poisonous; it should therefore be kept separate from every alimentary substance or other body subject to injury from stain. It is also corrosive of iron, steel, and zinc goods. It is packed in casks.

150 COPPERAS or gum vitriol, the sulphate of iron, as with copper sulphate. 20 hhds, weighing 17 tons, occupy 850 cubic feet or 1 keel. When wheat is 1/. $\frac{1}{4}$ quarter freight copperas should be 4/10 $\frac{1}{4}$ $\frac{1}{4}$ hhd. A hhd. weighs from 16 to 20 cwt.

151 COPPERAS, white. See zinc sulphate.

152 COPRA. At Bombay 12 cwt. go to a ton.

153 CORAL. E.I.Co. 20 cwt. rough coral to a ton, Bombay same.

154 CORK. Ships require full two-thirds of their ordinary ballast when loading cork; the heavier the ballast the larger the freight.

4 $\frac{1}{2}$ Tons Faro Cork will occupy a space of 850 cubic feet, or 1 keel of 21 tons 4 cwt. coal. When Wheat is freighted at 1/. $\frac{1}{4}$ quarter cork should be 21/6 $\frac{1}{2}$ $\frac{1}{4}$ ton. Another authority says, when wheat is freighted at 1/. per quarter, cork wood should be 20/. per ton, 20 cwt. If already manufactured and in bales, it pays, according to quality, from 10 to 20 per cent. more.

155 COTTON. As a general rule, some masters recommend about twenty-seven tons of ballast to every hundred ton of cotton, others think a larger quantity necessary. Cotton should be dunnaged at least 9 in on the floors and at the upper part of the bilge; the wing bales of the second tier kept 6 inches off the side at the lower corner, and 2 $\frac{1}{2}$ in at the sides. Sharp-bottomed ships one-third less dunnage in floor and bilges. Great

attention is required to see that as much as possible is put into the hold, but when screwed too tightly it has been known to rend a ship at sea. Where vegetable oil, especially linseed oil, or tar, is spilt on cotton, afterwards subjected to moisture, spontaneous combustion is almost sure to ensue; it is a saying at New Orleans that there is even sufficient oil in one seed when crushed or broken, to ignite a whole cargo.

156 East India Cotton shipped to Europe, and occupying four or five months in transit, should be carefully inspected before it is struck into the hold, to see that there are no marks of mildew or other signs of dampness on the bales, as much danger may arise on the passage, from spontaneous combustion, if stowed in bad condition.

157 From America to Liverpool cotton requires ordinarily to have at least six inches of good dunnage under the ground tier, nine in the bilges; billet of wood of six inches under the lower corner of the wing bales in the second tier. Some consider this dunnage insufficient.

Messrs. Holt & Co. of Liverpool estimate the average weight of the packages of cotton imported in 1854 at 407 lb per bag Upland; 443 lb Orleans and Alabama; 338 lb Sea Island; 182 lb Brazil; 295 lb Egyptian; 383 lb East Indian; and 210 lb West Indian. The gross weight of a bale of Egyptian cotton at Alexandria averages 230 rotolli or 228·07 lb, and allowing 12 rotolli as tare for sacking and cordage, the net weight of the bale will be 219 lb.

Another authority gives the weight of a bale of cotton wool from Virginia, Carolina, Georgia, and W. Indies, as 300 to 310 lb; N. Orleans and Alabama 400 to 500 lb; E. India 320 to 360; Brazil 160 to 200; Egyptian 180 to 283 lb.

The following quantities will occupy a space of 850 cubic feet, or 1 keel, viz. 8 333 tons New Orleans and Mobile all compressed, 9 166 do best carrying ships, 4½ do Charleston and Savannah, not compressed, 7 do Pernambuco and Maranhão, 9 700 do Alexandria, all compressed, and 5 tons do, not compressed. Vessels from Pernambuco and Maranhão generally stow 10 per cent more than half the register tonnage, part compressed say as above.

The E.I.Co. allows 50 cubic feet cotton, and 10 cwt cotton yarn to the ton, Bombay 50 cubic feet in bales; for mode of measurement see bale goods. New York 40 cub feet. The freight of cotton is frequently computed at 4 per lb.

When wheat is freighted at 1/4 per quarter, New Orleans compressed should be 11/7½ per ton, Charleston not compressed 20/5, Pernambuco compressed 13/10½, and Alexandria compressed 10/ per ton. Another authority says, when wheat is freighted at 7/ per quarter cotton in loose Egyptian bales should be £7 per ton of 20 cwt. or ¼d per lb. When in bales pressed by machines one-half less is paid than when in loose Egyptian bales.

158 COWRIES, small shells from the Maldive islands; Bombay ton, 50 cubic feet in cases or 30 cwt in bags; E.I.Co. 20 cwt.

159 CUBEBS, a small dried fruit; Bombay ton 12 cwt.

160 CUBIC Measure; 1728 inches 1 solid foot, 27 feet 1 solid yard.

161 CUTCH or terra japonica should be stowed below every article liable to damage from its soluble properties, and when practicable it should be kept before the fore hatchway. Heat will sometimes make it adhere so closely to the hold that the labour of discharging will cost as much as the freight obtained. Some recommend a rush mat between every bale,

to prevent one bale from sticking to another. It is frequently shipped in the East Indies as dunnage, which ought to be expressed on the bill of lading; it should not be used exclusively for that purpose, for if too little dunnage is laid on, the cutch when pressed by the weight of the cargo, will swell down between, and prevent the passage of water. At Singapore it is packed in bales of about 1 cwt each, covered with gunny bags and mats. Bombay ton 18 cwt.

162 CUTLERY and Hardware goods are packed in strong casks which should be well hooped to support any pressure; they are considered water tight, and for very fine goods are lined with soldered tin, when going to Australia or India. They should be kept apart from all articles soluble in water, such as sugar, salt, nitre, &c.

163 DAMAGED GOODS. By 16 & 17 Vict, c. 107, there is an allowance up to $\frac{1}{4}$ ths of the duty upon all descriptions of damaged goods except *cocculus indicus*, *nux vomica*, rice, guinea grains, lemons, spirits, corn, grain, meal and flour, opium, sugar, cocoa, oranges, tea, coffee, pepper, tobacco, currants, raisins, wine, and figs, upon which no allowance is made.

164 DANGEROUS GOODS. By sec. 329, Merchant Shipping Act, 17 & 18 Vict, c. 104, it is enacted, that no person shall be entitled to carry in any ship, or to require the master or owner of any ship to carry therein, any aqua fortis, oil of vitriol, gunpowder, or any other goods which in the judgment of such master or owner are of a dangerous nature; and if any person carries or sends by any ship any goods of a dangerous nature without distinctly marking their nature on the outside of the package containing the same, or otherwise giving notice in writing, to the master or owner, at or before the time of carrying or sending the same to be shipped, he shall for every such offence incur a penalty not exceeding £100; and the master or owner of any ship may refuse to take on board any parcel that he suspects to contain goods of a dangerous nature, and may require them to be opened to ascertain the fact.

165 A very large number of articles of freight may properly be placed in this class, as directly or indirectly they may become sources of danger; but, as under the heading of each separate article, these circumstances have been adverted to, it will be sufficient here to notice only those substances which are more generally recognised as dangerous. See the articles "Spontaneous Combustion" and "Ignition," for a list of those articles which are peculiarly dangerous on account of their liability to take fire either with or without access of flame.

166 Sulphuric acid or Oil of Vitriol, from being portable only in glass carboys or earthenware jars, is peculiarly liable to be spilt from accidental breakage. Care should therefore be taken to see that the carboys or jars are properly packed with straw, and the stoppers fastened down. The packages are usually baskets, but light wooden tubs are much better; especial attention should be given to the bottoms of the packages, as although they may look very well elsewhere, they may be defective there from standing in damp places or from leakages of acid over the mouth of the carboy, in pouring out. Directions have already been given elsewhere for the packing in the hold.

167 In cold weather brown acid or sulphuric acid, specific gravity 1.75, should be carefully protected from the cold, with a covering of straw or any other light material, as it freezes much sooner than water, viz at 42° Fahrenheit, water freezing at 32°. It is also in freezing more rapidly converted into a solid mass; after it is once frozen, it takes a very long time to thaw. Whether partially or entirely frozen, it is very dangerous for moving about, indeed it becomes almost impossible to do so without breaking the carboys. This acid does not of itself give off any vapor, but it has a powerful corrosive action on almost every substance that it can come in contact with, whether it be mineral, metallic, animal or vegetable. On mixture with water, great heat is given off, and the resulting weaker acid is more rapidly corrosive than the strongest acid; if therefore, a package be broken and the acid spilt over any substance, it is better not to throw water over it until sufficient is at hand to have a large excess; it is less dangerous to leave it alone for a short time than to throw only a small quantity of water over it; so in case of a man having even the strongest acid spilt over him, no injury will accrue if he have sufficient confidence to wait until he can be deluged with water. A small quantity of water may scald so terribly as to cause death.

168 Muriatic and nitric acids are packed in the same manner as sulphuric acid; as they are both volatile acids, it is especially necessary to take care that carboys containing them are carefully stoppered to prevent their vapors acting on surrounding bodies. The acids and the vapors arising from them are both very corrosive of metals as well as of other bodies. Chalk, whitening, limestone, lime, calcareous or limestone sand, soda, soda ash or alkali, barilla, potash or pearlash,—any of these bodies separately or together, will neutralize the action of these acids. Acetic acid is also a volatile acid producing the same effects as nitric and muriatic acids, in less degree. A ship carrying a quantity of either of these acids should be provided with a few cwt. of slacked lime in barrels, ready for use, in case of accident, for the absorption and neutralization of the spilt acid. Very corrosive vapors are also given off by chloride of lime, but see the article thereon.

169 White arsenic or arsenious acid in powder, should be carefully kept apart from any articles of food, as the packages are heavy, and if, being injured, any of the powder be sprinkled over them, serious consequences may result. For the danger from other poisonous substances, see "Poisonous bodies." Liquor ammonia or spirits of hartshorn is packed in carboys or jars; its vapour is exceedingly penetrating, and although alkaline and not acid, has a very powerful action on articles of bronze or brass. If a package be broken the vapours should be most carefully avoided, as they are so powerfully irritating, that a sudden full inspiration of them has been known to cause death. Any of the acids mixed with water, but more especially muriatic acid, will quickly neutralize it and render it innocuous. Serious damage may also be occasioned by substances which are soluble in water, being dissolved, and thereby diffused through or over the cargo; see "Substances soluble in water."

170 DATES, the fruit of the palm tree. At Bombay 20 cwt. wet, 16 cwt. dry, go to a ton.

171 DEAD FREIGHT. In the Common Pleas, July 2nd, 1851, in the case of the *Balgownie*, Nichol v Ellis, it was decided that a ship being chartered to load a cargo of soda, nitrate of soda, guano, or copper ore, &c. "not exceeding one third more than her registered tonnage, old measurement;" this is intended to protect ships from being overloaded, and does not oblige charterer to ship the full amount. It is

enough if he put on board so much cargo as ship can conveniently carry, but if more might have been properly shipped than what was put on board, the shipowner is entitled to a verdict for dead freight. The measurement of the ship being 379 tons *o.m.* and 325 *n.m.* one-third more added to her old measurement would equal 505 tons 6 cwt. and there were shipped of copper ore only 453 tons, 4 cwt. leaving a difference of 52 tons 2 cwt. which it was contended could have been shipped, the freight and primeage on which would have amounted to £246 3s. 6d. The jury gave £150 damages.

172 DEFICIENCY of Cargo. An Exeter shipmaster writes the Editor of the Gazette, Jan 12, 1857, "I brought four packages gin under bond, from London; on delivery three bottles were missing and the value charged to me: they may have been removed before shipment. Can I as last hand be held responsible, and if so can I not hereafter claim to see contents? I once received a pipe of wine apparently short, and got a cooper and a witness who found four gallons deficient; the owners threatened to fine me for raising the bung." Answer, the master has a right to be satisfied that contents are truly stated as per bill of lading, but not to open unless in the presence of the shipper or his agent; the proper time is when the package is tendered to the custody of the ship. See Wastage.

173 DEMURRAGE is the allowance made to the ship for detention beyond the stipulated time for receiving or discharging cargo. A certain number of days are usually stated on the charter party or bill of lading for this purpose, and the freighter can detain the vessel as long as he pleases after, usually not more than ten days, on paying so much *per diem*. The ordinary form " days to be allowed the said merchants for loading at and discharging at Should the vessel be detained longer than the said days, demurrage the sum of £ to be paid day by day for all days so detained," but the merchants not to detain the vessel longer than ten days. When the stipulated time expires, the master should give written notice through a third party, to the freighter. See sec 108. A master should give notice to the charterer immediately his vessel is in her discharging berth.

The Shipping Gazette, Jan 20, 57, considers that laying days not being stated, two or three days sufficient to discharge 60 ton Bangor slate, and demurrage due for every day beyond. The consignee or assignee is not liable for demurrage for time consumed at the port of loading, unless by the express terms of the charter party or bill of lading, he is made liable. *Smith v Sieveking, Excheq.*

174 DRAGON'S BLOOD, the produce of a large species of rattan. E.I.Co. 20 cwt to the ton, Bombay 50 cubic feet.

175 DRUGS and Chemicals. Alkalies, liq. potassæ, liq. ammoniæ, (hartshorn) and some other chemical preparations, such as chloride of lime in solution, are sometimes put in corked vessels; these substances will destroy the cork (eat it away) and therefore require care on board ship. They should, if possible, always have glass stoppers. At Bombay 50 cubic feet of unrated drugs in chests go to a ton; in some parts 16 cwt.

176 DUNNAGE. All perishable goods require dunnage; the quantity for different kinds will, in many cases, be found under their

proper headings. The general rule is to have not less than six inches in the bottom and nine in the bilges, and to mat all the way up the sides with cargo in bags. As the water in the bilges cannot be removed when the ship careens, so the dunnage must be deeper there,—this applies especially to flat-floored ships, some of which require extra dunnage also near the breast-hooks, with cargo in bulk, which naturally settles there when the ship is pressed with sail shortly after loading. The larger the ship taking a full cargo the greater must be the pressure in the lower hold, and hence the necessity for a deeper bed, from the keelson to the second futtock head, particularly with brushwood and other compressible materials. To judge of the thickness of brushwood, stand on it and measure from under your feet. In stowing any description of cargo, longers should be kept square and as level as possible; it is better to have considerable breakage than neglect this most important rule.

177 An experienced master strongly recommends that the first layer should be athwart ships and not too close, and ought to be of a good depth, because the rolling movement is more frequent and at a much greater inclination than the movement fore and aft. If the cross dunnage is too near the skin or ceiling, the wash which may be on it will be impeded as it runs from side to side, and the water will splash against the cargo, which is generally damaged here after severe weather has been experienced. Another master, chiefly engaged in the Labrador and Newfoundland trade, recommends the longering to be laid fore and aft, not too near each other, in order that the wash shall be restricted to so small a quantity that it will be insufficient to injure cargo, and will prevent any body of water from collecting in the wings and thus damaging the cargo. In this case dunnage athwartships.

178 Green or wet wood is totally unsuited for dunnage; it will damage both the cargo and the ship. Horn shavings should be avoided at Calcutta, where and at other Indian ports, horn tips are shipped when better descriptions of dunnage fail. Redwood being heavy is very useful. Rattans are frequently purchased by the ship, and are well adapted for the sides only. At Rio Janeiro, if it can be obtained, prefer rosewood to logwood. When sawing logwood do not let the dust remain in the hold, for if wetted it will discolor and damage sugars and other goods. See Coker nuts, catch, &c. The best dunnage laid in the best way will not prevent injury to cargo if the pumps are neglected either in harbour or at sea. After lying a long time on one tack, a vessel should bear up, sound the pumps, and if necessary clear the hold, and make the pumps suck.

179 In case of dispute on discharging, if the Surveyor declares the dunnage not sufficient, the ship is liable for the damage in the bottom, although the Surveyor cannot cite any authority as to what would have been sufficient dunnage. Apart from any local or specific regulations, the general rule is that the dunnage must be "sufficient" according to the nature and quality of the cargo.

180 It is customary that all mats, wood, sticks, rattans, &c. necessary for dunnage, stowage, or the preservation of goods, should be free of freight.

181 In the case of the Grecian, reported in the Shipping Gazette, Aug. 8th, 1855, it was decided at Antrim, that the owner was liable for damage to sugar through insufficient dunnage. The evidence showed there should be 5 to 6 inches to raise the bilges, and 9 inches to raise the other parts of each cask; she had only 2 or 3 inches.

182 A master asks the Shipping Gazette, 11th June, 1856, whether it is necessary on a coasting voyage to have as much dunnage for guano as if coming from Callao, and is answered. "The same rule is applicable to coasters as to others, viz. that such dunnage is to be used as shall be proper and sufficient to protect the cargo from damage. Where there is any doubt and the question may arise as to how far the ship is liable, the master should, in all cases, discharge cargo under survey."

183 A Glasgow shipowner asks the editor "How much, if any, dunnage an iron ship should have in her bottom when her floor is raised about 20in. above the skin, and she has thus an enormous water-space? Wooden ships require some 8 or 10 inches, but they have not a fourth of the water-space, owing to the timbers filling up nearly all the space between the floor [ceiling] and outside planking. Also, how much in the wings when the ship has a great rise of floor? Also, if any dunnage is required in the sides, when wooden stringers, 6 in. by 2½, are bolted on to the angle iron, 12 in apart to prevent damage to goods either from chafe or wet; the space in the sides from the inner part of the stringer to the skin being the depth of the angle iron, say 5 or 6 in." The Editor says, 20th May, 1856, "Although it may not be actually necessary to have as much dunnage in an iron ship as in a wooden one, for the reasons assigned by a Glasgow shipowner, yet, as usage has adopted an 8-in depth for a ship, without reference to the shape of her bottom, we fear that in the event of damage to the ground tier in any description of vessel, whether iron or wood, the parties would have a claim. It might be argued that a leak in the waterways, or stem or stern-post, above or without the skin or ceiling, would probably cause an accumulation of water above the skin, which, before it could get to the pumps, might injure the ground tier without reference to the space between the bottom of the ship and the ceiling. As iron ships are becoming an important and increasing feature in our own merchant service, and as they do not generally require the same extent of dunnage as ships built of wood, it would be well if some rule were agreed upon and adopted by owners, shippers, and others concerned, as to the necessary dunnage for iron ships."

184 **EARTHENWARE** in bulk should lie on a flat surface—the nearer the bulk-head the better; if on coal, first cover with a plentiful bed of straw. Crates should either be slung or hooked with can-hooks to the twist and not to the bars of the crates; if covered, stow them face down provided the bed be level. Salt will rot straw and cause breakage; crates, &c. should therefore be kept at a distance from it; water will have nearly the same effect. It is usual at Newcastle, when loading Earthenware and Glass, for the shipper to send a man into the hold and the master to place one in the lighter.

28 Crates of Earthenware, small size, weighing 10 tons; 22 do. mixed sorts or middle size, 9 tons; or 16 do. large size, 7 tons; will occupy a space of 850 cubic feet or 1 keel. When wheat is 1s per quarter freight, earthenware per crate, should be small 3s 5½d middle 4s, 5d, and large 6s 0½d.

185 **EBONY.** E.I.Co. 20 cwt. Bombay 20 cwt. or 50 cubic feet in square logs to the ton.

186 EGGS may be preserved for many months by steeping them, when fresh, in a dilute solution of sulphate of zinc, 1 part to 20 parts of water; no chemical change takes place within the shell. It is also said that they will keep during a long voyage if stowed in salt, perfectly dry, or in fine salt-water sand, the big end down; or, in slacked lime if previously coated with gum, or in oak sawdust, if previously dipped in melted grease, not too warm, or rubbed with it.

Irish Eggs for the London, Bristol, and Plymouth markets, are packed in cases containing fourteen hundred—every hundred 120; each case measures, on an average, 2ft. 4in. long, 2ft. wide, and 18in. deep, making 7 cubic feet. To Liverpool they are generally sent in cases and crates, holding 40, 50, or 60 hundred each—40 cubic feet to the ton.

187 ELEPHANTS' Teeth are usually packed in very long barrels. See ivory. E.I.Co's ton, 16 cwt; Bombay, 16 cwt or 50 cubic feet in cases.

188 EMERY STONE. When Mediterranean wheat is freighted at 1s. per quarter, emery stone should be $\frac{4}{8}$ per ton of 20 cwt.

189 FEATHERS. Russian feathers require one-third more space for stowage than hemp, which see. The Baltic rate of freight for feathers is the same as Codilla hemp per ton of 44 poods gross. A bale weighs 1 cwt; a last 17 cwt. In some places 1,700 lbs. form a last.

190 FERMENTATION is the result of chemical action in its incipient state. It is somewhat analogous to combustion, and is not unfrequently the preliminary stage of it. It is produced by the reaction of certain substances, principally animal and vegetable, on each other, under the influence of heat and moisture together. Heat alone is not sufficient for the production of fermentation; air, in small quantities, and moisture, must also be present at the same time. There are various sorts of fermentation, such as the vinous, acetous, and putrefactive. The vinous is where saccharine matter is converted into alcohol or spirit, as in the production of beer by the fermentation of wort obtained from malt, or that of wine from must—the extract of the grape. The acetous is a further development of the vinous, resulting in the production of acetic acid or vinegar. The putrefactive fermentation is more commonly developed in animal substances or in those vegetable bodies whose composition more nearly resembles that of animals. Cargoes of fruit, especially those which are very juicy, such as oranges and lemons, of wheat, hemp and flax, hay and straw, dry fish, hides, &c, require especial attention to prevent injury by the development of fermentation. The measures to be adopted are indicated by a consideration of the circumstances above noticed, as affecting fermentation. As the most effective means are dependent upon ventilation, see that article. It is important that the ship-master should well observe the condition of the cargo in course of shipment, as in case of damage from fermentation, it may be of the utmost importance to be able to decide whether the damage has arisen from the effects of defective condition at time of shipment, or from any injurious circumstances occurring subsequent to it. It will be well also to note, that manufactured goods, such as silk, linens, &c. which have received damage from fermentation, are not always

to be considered as having been affected by defective arrangements on board ship, for not unfrequently such goods receive damage through bad preparation, such as the employment of improper sizing or the want of proper cleansing in the final dressing; see silk.

191 FIRE. In the Queen's Bench, Jan 22/25, *Morewood v. Pollock*, where cotton was destroyed by fire at Mobile, on board a lighter in the use of the owner, he is liable. See Mer. Ship Act, 1854, sec. 503.

192 FISH. Charter for dry fish by quantity and not by weight, for the state of the atmosphere greatly alters the weight. Fresh Fish may be legally landed on Sundays; see landing. In Newfoundland, &c. 20 quintals dry fish go to a ton; 8 barrels or 6 tierces pickled fish; 340 Labrador herring 1 barrel; 12 barrels (flour barrels) dry caplin go to a ton. At New York 6 barrels pickled fish, 16 cwt. dried cod fish in bulk, or 12 cwt. in casks of any size, go to a ton for freight. For herrings, Labrador fish, pilchards, &c. see the several headings.

Anchovies, barrel	30lb	Herrings, a measure ..	600 fish.
Cod Fish, quintal	112lb	" a cade	500 do
" a last	12 barrels	Pilchards, barrel	41½ im gal
Fish a stone	14lb	hhd abt 3000 fish	lb
Herrings, white, a last ..	12lb	Sprats, a cade abt 1000 ..	
" barrel	26½ im gal	Salmon, a box	120 to 130lb
" cran	37½ do	Sturgeons, keg	4 to 5 gals.

193 FLAX. A full cargo will require more than half the ordinary ballast, which should be stone. A ship of 350 tons which took equal to 300 tons clean hemp, required 100 tons of ballast. Dunnage, bottom 9 inches, 14 to the upper part of the bilges, 2½ at the sides. For stowage see cotton, hemp, &c. When oil or tar has been spilled on flax, it is very liable to spontaneous combustion on the introduction of moisture. New Zealand Flax, which is generally taken at double freight, is said to be liable to ignition when wetted either with water or oil; see cotton.

At St. Petersburg 16 bobbins of 12-head flax or 63 poods are reckoned to a ton, and 47 bobbins of 6-head or 63 poods to a ton. At Riga, six ship-pounds, 330 lb each, make a ton. At Archangel, 2 tons of clean flax are equal to 1 ton of Codilla and Tow, and receives the same freight. The Baltic Rates of freight for flax is in all cases the same as hemp. The E.I.Co. allows 50 feet sunn flax to a ton.

When Mediterranean wheat is freighted at 1s. per quarter, clean flax should be 10/6 per ton of 20 cwt. Flax or hemp half clean pays 15 per cent more than clean. Outshot pays ½ more, and Codilla ¼ more than clean hemp. A Russian bale or mat weighs 5 to 6 cwt. Russian 12-head bobbins 126lb; pood 36lb English and 40lb Russian. Dutch matt 126lb. Flemish bale 224lb. A last 17 cwt, in some places 1700lb.

194 FLOUR requires same dunnage as flax, and is allowed to stow six heights of barrels; see general cargo. American shipowners in the stowage of mixed cargoes in large ships, have, through experience, discovered what "pressure" flour barrels, provision casks, &c. will bear, and so avoid reclamations for damage if otherwise properly stowed; hence, in large ships above 600 tons, with dimensions exceeding in length 4½ times the beam, and 21 feet depth of hold, orlop decks will come into general

use so as to relieve the pressure by dividing the hold, like a warehouse, into stories. The large ship *Liverpool*, which left New York in 1854, with an entire cargo of flour, was never heard of after; it is supposed the lower tiers of barrels gave way, and that the cargo having got loose, shifted in a gale of wind, and capsized the vessel. Flour, if stowed near, will readily imbibe the scent from oranges and lemons; this scent will go off in a great degree, when the flour is exposed to dry air. The scent from coal tar, Stockholm tar, varnish, &c. will not go off.

In April, 1856, an action was brought in the Queen's Bench, under 15 and 16 Vic. cap. 16, sec. 46, against the owners of the *Star of the West*, which shipped at New York, 2,150 barrels flour, 600 bales cotton, 800 tierces lard, 100 hhds tallow, 520 barrels spirits turpentine, 57 pun turpentine, 3,600 bar. tar and other minor articles. The exporters of flour were not forewarned that turpentine would be shipped. On delivery the flour was tainted by turpentine, although stowed at a distance from it. Lord Campbell pronounced the owner liable. See extended report, page 13.

140 barrels flour, 220lb each, 196lb nett, weighing $13\frac{1}{2}$ tons, or 160 sacks, 280lb each, 20 tons, will occupy 850 cubic feet or 1 keel. 8 Sacks of Irish flour go to a ton. In Australia, flour is freighted at 2000lb to the ton. At New York, 8 barrels of 196lb each.

When wheat is freighted at $1s \text{ } \frac{1}{2}$ qr, flour should be $8\frac{1}{2}d \text{ } \frac{1}{2}$ bar. or $7\frac{1}{2}d \text{ } \frac{1}{2}$ sack. Another authority says, when Mediterranean wheat is freighted at $1s \text{ } \frac{1}{2}$ qr, flour should be $6d \text{ } \frac{1}{2}$ bar. and $5s \text{ } \frac{1}{2}$ ton of 20 cwt in bags. 10 bar. are considered equal to a ton. If brought from Spain 5 bar. are equal to 8 qrs wheat.

A gallon of flour weighs 7lb; bushel 56lb; a boll of 10 pecks or stones 140lb. A pack or load, 240lb; sack or 5 bushels 280lb; an Admiralty barrel contains 336lb net; $\frac{1}{4}$ -hhd. 250; and kilderkin 168lb. A barrel of American 196lb; $\frac{1}{4}$ -barrel 98lb.

195 FREIGHT. See the stowage of goods in the introduction, and section 23, on tonnage for freight, bills lading, charter-party, &c.

196 FRUIT. When loading currants at *Zante*, say in a sharp schooner of 115 tons, place the largest casks each side the keelson amidships, the lesser fore and aft, to suit the shape of the hold; when chartering secure sufficient small casks to fill up. Dunnage is found by the ship, and is placed as usual in the bottom, and slightly up and down the sides; fustic is sometimes shipped as dunnage, free of freight. A schooner of 115 tons register, *o.m.* will take her tonnage of nett fruit. The tare allowed by the Customs and the trade is for butts 18lb per cwt, carotels 20, boxes and barrels, actual; the smaller the packages the greater the tare. A vessel 11ft. 8in. in depth will take 3 heights of butts of currants with the usual dunnage. When chartering, say "packages suitable for stowage at the option of the master." One charter-party said "in butts, carotels, barrels, ^{and} cases, sufficient small packages for stowage." She was given two-thirds of her cargo in *cases*, and having a few of each of the other packages named, the master could not refuse; but the shipment of so many *cases* threw her 10 tons out of her proper cargo.

197 At *Malaga*, the same schooner will require 10 or 12 tons shingle, pebble, limestone, or other dry ballast; barrels of grapes encased in mats, forward, say three or four tier; midships and aft, boxes and half boxes of raisins right up to the beam; lemons aft by themselves, to protect

other goods from their steam; melons on deck; almonds on the top of the raisins; figs in the wings. The tare on Malaga dry fruit is rather more than that of Denia; and vessels, when laden with part lemons, grapes, &c, do not carry near so much tonnage. The quantity of grapes ought to be limited, or additional freight paid.

198 At *Denia*, raisins only; a large proportion of them are packed in baskets which contain $\frac{1}{2}$ cwt. about the same as boxes, and occasionally $\frac{1}{4}$ -boxes which contain 14lb each. Baskets should go aft, not over or under boxes in more than one tier; when too much pressed the juice of the fruit will run upon and injure the goods beneath. Some *Denia* charter-parties say "ship to be well and sufficiently dunnaged with wood or stone and not rosemary or any deleterious substance whatever." Almonds are sometimes shipped at *Denia* in their shells in bags, and shelled in boxes and barrels.

199 *Almonds*, being light, are stowed in the upper part of the cargo, where most convenient for trimming. Sweet almonds are imported in mats, casks, and boxes; the bitter arrive in boxes; 15 cwt go to a ton.

200 Care should be taken to keep dry fruit from green. Currants and raisins are very liable to become heated, especially when shipped in bad condition; they will then cause leakage from any casks of liquids near; in a heated state, maggots and other insects are speedily brought to maturity, to the great injury of the cargo and inconvenience of the crew. All unripe fruit is liable to ferment; see fermentation. The hatches of vessels in some fruit trades are temporarily built up three or four feet above the combings, and are fitted with lids to admit air at sea when the weather is favorable.

In the Sheriff's Court, Lon. Jan 19, 1854, *Oelricks v Robinson*, the owner was declared liable for the loss of a cask of currants, through lumpers negligently using can-hooks when discharging in the Thames during the swell caused by passing steamers.

17 Tons Currants occupy a space of 850 cubic feet or 1 keel.

When Mediterranean Wheat is 1s 8d qr freight, Raisins should be 6s 8d and Currants 6s 3d Φ ton of 20 cwt nett weight.

Currants; a butt weighs 17 to 20 cwt; carotel 5 to 7 cwt; a box $1\frac{1}{2}$ to 3 cwt; a barrel $2\frac{1}{2}$ to $2\frac{3}{4}$ cwt.

Raisins; a drum 24lb; a barrel 1 cwt; cask of Malaga 1 cwt; of Turkey $2\frac{1}{2}$ cwt; box Malaga 22lb; $\frac{1}{4}$ -box Valentia 28lb, box 56lb.

An Admiralty barrel of Raisins contains 336lb net, $\frac{1}{4}$ -hhd 224, kilderkin 168, and small cask 112lb. See table 3, page 20.

Figs; a frail of Faro 32lb; Malaga 56lb; barrel of Malaga 96 to 360 lb.

Prunes; a barrel 1 to 3 cwt; puncheon 10 cwt.

Plums; a $\frac{1}{4}$ -box about 20lb; cartoon 9lb.

Almonds; a box of Jordan 25lb; a basket contains $1\frac{1}{2}$ to $1\frac{3}{4}$ cwt; and a saron $1\frac{1}{2}$ to $1\frac{3}{4}$ cwt.

Tare on currants is 16 to 20 Φ cent. Tare on *Denia* raisins 6 to 9lb on $\frac{1}{4}$ -boxes, 11lb on boxes.

201 *Oranges and Lemons*. A ship will ordinarily require one-fourth of her tonnage for ballast; boxes of oranges are stowed on their sides, bilge to back, as many tier as the hold will take; the top tier bilge up.

Lemons being heavier are generally stowed below oranges. Discharge in dry weather. Some Lisbon charter-parties are as follows:—"as much as can be stowed in the hold between the fore and after bulk head; to be stowed in the customary manner, so as to allow an air-hole 2 feet square under each hatchway, to extend from the bottom of the hold to the top of the deck; which air-hole is to be kept empty and free of all sails, cables, &c. Windsails are to be used down such air-holes; and part of the bulk-heads are to be removed to afford ventilation to the cargo. The vessel to be ballasted with iron, metal, dross, stone, or shingle, not sand, chalk, or mud, or anything prejudicial to fruit. The victuals to be cooked upon deck and not below. The hatches to be kept open at all times during the voyage, when the weather will admit."

8 Tons of Oranges and Lemons, of 10 chests or 20 boxes per ton, will weigh 10 tons, and occupy a space of 850 cubic feet or one keel; 10 boxes, 20 $\frac{1}{2}$ -boxes, or 30 $\frac{1}{4}$ -boxes go to a ton. 30 Russian-size boxes are equal to 20 London-size boxes. Some masters calculate that a vessel which stows 18 tons St. Michaels, will stow 28 tons of Seville and 30 tons of Lisbon or St. Ubes. A Schooner which stowed 38 $\frac{1}{4}$ tons St. Michaels, stowed 52 of Lisbon.

When wheat is freighted at 1s. per quarter, oranges and lemons should be 12s 1 $\frac{1}{2}$ d per ton; some consider this rate 20 per cent too much in favor of the wheat; and a fruit merchant reckons 1s 5 $\frac{1}{2}$ d quarter for wheat equal to £1 7 $\frac{1}{2}$ d ton for St. Michael's oranges.

Another authority says when Mediterranean wheat is 1s 5 $\frac{1}{2}$ d qr. oranges and lemons should be 8d 5 $\frac{1}{2}$ d case or 12s 5 $\frac{1}{2}$ d ton; this refers to Sicilian cases containing about 1000 fruit. A box is $\frac{1}{3}$ ds of a case, and pays accordingly; a thousand of those cases count for 50 tons. From the Azores 20 English and 30 Russian size boxes count to the ton; from Spain or Portugal 10 chests or 20 $\frac{1}{4}$ -chests or boxes count to the ton.

8 Admiralty cases Lemon Juice or 16 half ditto 1 ton.

202 FURS. At New York, 40 cubic feet of Beaver Furs, Peltries, &c, go to a ton.

203 FUSTIC, the wood of a species of mulberry growing in the Ionian Islands, Greece, South America, the United States, and the West Indies; it is sometimes shipped as dunnage. N. York ton 20 cwt.

204 GALANGALES; the root of the galanga tree cut in pieces an inch long and hardly $\frac{1}{4}$ -in. thick. At Bombay 12 cwt. go to the ton.

205 GALBANUM, a species of gum resin growing near the Cape of Good Hope, in Syria, and Persia; from the Levant it is brought in cases or chests from 100 to 300lb each. E.I.Co. allows 16 cwt. to a ton.

206 GALLS. A sack 3 $\frac{1}{2}$ cwt. Bombay ton 20 cwt.

207 GAMBIER, a plant of a sticky nature, and when shipped at Singapore, should be kept off from sago, sugar, coffee, spices, &c. It is sometimes packed in rattan baskets, holding about 1 cwt. each.

208 In the Common Pleas, Dec. 16, 1856, *Gorissen v Perin*. According to plaintiff's case, a bale of Gambier meant a parcel weighing above 2 cwt which had been compressed by hydraulic power into an oblong mass, and was then bound up in matting. Defendant had brought from Singapore 1170 parcels bound up in matting but not compressed, and weighing only 60lb or 70lb each, which he contended were bales. The jury found that they were not bales.

209 GENERAL CARGO. Select the strongest casks, such as beer, tallow, &c. for the ground tier, and not dry goods if it can be avoided, reserving wines, spirits, oils, vinegar, and molasses for the second or third tier, to reduce the pressure, according to size of ship. Although stevedores may be employed the attention of the master or mate should be specially directed to prevent dry goods, in bags or bales, from being placed near leakage goods or moist goods, such as salted hides, bales of bacon, butter, lard, grease, &c; dry goods should, if possible, be stowed in the after hold.

210 Manufactured goods, dry hides, and other valuable articles, should have dunnage, $2\frac{1}{2}$ inches thick, against the sides, to preserve a water course. Miscellaneous goods, such as boxes of cheese, kegs and tubs of lard, or other small or slight-made packages, not intended for broken stowage, should be placed by themselves and dunnaged as other goods, and if practicable, stowed at each end of the vessel.

211 Tea, and flour in barrels, flax, clover, and linseed, or rice in tierces, coffee and cocoa in bags, should always have nine inches at least of good dunnage in the bottom, and fourteen to the upper part of the bilges, with $2\frac{1}{2}$ in. at the sides; allowed to stow 6 heights of tierces and 8 heights of barrels.* All ships above 600 tons should have 'twixt decks or platforms laid for these cargoes, to ease the pressure. Caulked 'twixt decks should have scuppers in the ceiling at the sides, and $2\frac{1}{2}$ inches of dunnage, laid athwart ship and not fore and aft-ways, when in bags or sacks, and when in boxes or casks not less than 1 in. When mats can be procured, they should be used at the sides for tea, &c.

212 Such articles as guano, superphosphate, bone dust, &c. ought not to be shipped with a general cargo of dry goods.

213 *West India Cargoes* should have at least 6 in. dunnage on the flat bottom, and 9 on the bilges, 3 beds under each sugar hogshead, and 2 under each cask. Casks of rum and molasses, with bungs up, to be well bedded and quoined off, stowed bilge free, and well chocked; on no account to exceed 4 heights of riders. To be careful not to stow rum, molasses, or other liquids, on coffee, or any other goods liable to be damaged by their leakage. If coffee, pimento, or other goods in bags, should form part of the cargo, they may be either stowed in a vacancy by themselves, or on the other cargo, provided the cantlines of the casks be well filled with wood, &c. to prevent the bags from being chafed by the working of the casks at sea. Should the whole cargo be in bags, (say coffee) staves or matting, or both, should be placed all the way up the sides, round the pump well, masts, stanchions, &c. If a vessel have the lower deck laid and caulked, it will be necessary to dunnage it also.

214 In stowing a ship of 500 tons register, *o.m.* having a beam of about 35 feet, with a full cargo of sugar in hogsheads, the following course has been observed advantageously for many years. Long wooden hoops, laid athwart ships, so as not to impede the molasses' drainage, receive 12

* Another authority considers that 4 heights of seeds, &c. in tierces, and 5 of flour in barrels is sufficient, but adds, that where small battens are laid across a great relief of pressure will ensue.

to 14 lancewood spars fore and aft. Commence the ground tier by placing the midship hogsheads alongside the kelson, fore and aft; next lay a row of hogsheads, burton fashion, from abaft the after hatch to before the fore hatchway, round those previously laid amidships; then fill up the wings by laying a row fore and aft, well on, which completes this tier. Next tier, all fore and aft, then begin to peak up to the deck at both ends. Third tier, square up. Fourth, burton fashion from the after part of the main hatch to the after part of the fore hatchway; the remainder fore and aft. Between the beams, burton. In the 'tween decks puncheons of rum; all the wing casks, burton, from the after part of the main hatch to the rising of the forecastle deck. All the rest fore and aft. Pimento and ginger on the rum, but out of the way of deck leakages from the waterways, windlass, stanchions, &c. The casks of rum must be chocked and bedded with soft wood. The bilges of the casks must be free and bungs up; hanging beds. Barrels of ginger must be stowed on their heads

215 *East India Cargo.* When putting dry cargo on moist, or putting one against the other, let double mats intervene. Mat in the way of iron knees and iron stanchions; dunnage and mat round masts.

The three following are abridged from Murphy's United States Nautical Routine :

216 *Liverpool Cargo.* In the fall of the year, about 150 or 200 tons of coal are levelled fore and aft in the bottom. Then a proportionate quantity of pig or bar iron, with strips of board, at intervals, to prevent the iron from burying itself in the coal. Crockery in the wings fore and aft. In the after hold articles of particular value, such as cloths, laces, mousseline de laines and other dry goods, with plenty of dunnage and chocks, not only against leakage, but to prevent chafe, an injury worse than any other. In the fore hold and the forward part, "rough freight," such as crates and hogsheads of stone and earthenware, chocking and dunnaging all safely. Sacks of salt in the main hold near the centre.

217 *New Orleans Cargo.* If liquids, as oil, brandies, cider vinegar, &c, place them on the ballast in the after hold, with bales and cases of dry goods over. In the main hold hardware, &c. Fore hold, or all forward, rough freight such as hogsheads of light hardware, crates of crockery, casks of oil, &c. chocking and dunnaging in a proper manner,

218 *French Goods* require great care; dunnage at least 12 or 14 in. high over the floor heads. Stow the cases in the after part free from the wings, masts, pumpwell, &c. protected at every point from contact with moisture. Baskets of champagne and other light wines, being less valuable, are placed separately, to prevent leakage on silks, laces, &c.

For Passenger Ships, Emigrant and Troop Ships, see the letter p.

219 GINGER. E.I.Co's ton 20 cwt green,—16 dry, Bombay 20cwt green,—14 dry. A bag of Jamaica about 1 cwt, Barbadoes 1½cwt, and East India 1 cwt.

220 GLASS. Crates of, should be packed perpendicularly by each other, and firmly wedged together so that the glass will not talk or sound when the ship rolls. Keep at a distance from salt or wet or the

straw will rot and breakage ensue. In loading or discharging hook the crates at each end and not across. When stowing with coal it should be carefully trimmed into the cants or ends of the crates; other goods are preferable as coal soils the crates. More damage is usually done in receiving and delivering than during the voyage; it is almost invariably the outside table which is broken. Masters should refuse crates of glass or bottles, if the straw is wet, for breakage will inevitably ensue.

A keel, 850 cubic feet, consists of forty 18-table crates, $4\frac{1}{4}$ tons; fifty 15-table 5 tons; or sixty, 12-table $5\frac{1}{4}$ tons. A stone of glass weighs 5lb; a seam is 24 stone, or 120lb.

221 Boxes of *German* sheet glass should be stowed on their bottoms; about 40 of these go to the keel of 850 cubic feet or $4\frac{1}{4}$ tons weight.

222 *Plate Glass* is packed in cases; the chief cause of breakage arises from their not being stowed with the proper edge up, as marked. When not marked, they are safer on their edges than on their flat. Great care must be observed when slinging. Silvered glass must be kept off from every thing of a damp nature.

223 *Glass Bottles*, green or black, when laden in bulk on coal, the latter requires to be levelled as smoothly as possible, and the large knobs thrown fore and aft. Throw a plentiful bed of straw on the coal and wedge the bottles so that they will not talk when the ship moves. The manufacturer sends an experienced hand to stow the bottles, and the master sends one of the crew into the lighter, as with earthenware.

100 gross of quarts, 6 per gal, 19lb weight per doz, in bulk 10 tons; 200 gross of pints, 12 per gal, 11lb weight per doz, in bulk $11\frac{1}{2}$ tons; or 80 crates bottles $10\frac{1}{4}$ do, cubic feet each, 10 tons, go to a keel or 850 feet. When wheat is 1s per quarter freight, bottles 6 to the gallon should be $11\frac{1}{4}$ d per gross and in crates 1s $2\frac{1}{4}$ d.

224 GLOVES. A dicker is 10 dozen.

225 GOLD. When shipping at *Melbourne*, and the cargo is nearly complete, the captain attends at the different banks daily, at stated hours, to see the gold weighed; after which it is placed in small strong wooden boxes made for the purpose, generally containing about 1,000 ounces each; they are screwed down in his presence, sealed with his seal, and that of the bank where the boxes remain until a day or two previous to sailing, when all is taken, at an appointed hour, to a steam-boat provided by the captain, and conveyed to the ship. Occasionally an agent attends at the banks, and sees the gold weighed and sealed, and otherwise acts for the captain if it is not convenient for him to attend; but the captain, being the responsible party, should prefer acting for himself. As the gold comes over the gangway the chief mate takes the ordinary account, and it is then ranged along the deck of the cuddy, where it is again counted by the captain, after which it is passed down into the gold chest or safe, which is generally in the lazarette or lower part of the ship, close aft, and stowed away by the second and third officers, counted as it goes down, and also as it goes into the safe; when deposited and the safe locked, the key is delivered to the captain. Another authority says, there are two keys, one in charge of the master the other of the mate, until all the gold

is deposited, when the mate's key is delivered into the charge of the master, who places a seal on the key-hole and makes periodical inspections of the safe on the voyage home. Agents from the banks come with the gold and present their bills of lading to the captain for his signature; the steam boat being retained until all is complete, when, with the bills of lading signed, they return ashore in her.

226 Where ships are not provided with strong chests, a "stow hole" is sometimes left, in which the gold is placed, and then buried with bales of wool or other bulky goods. The gold ought to be placed where no one but a trustworthy officer has any business to go, and the chests and fastenings should be occasionally examined. Upon the ship's arrival in the London docks, and when alongside the quay, the safe is unlocked, and the gold passed up into the cuddy, where it is counted as before. It is then put into a cart or waggon, in charge of the captain, whose responsibility does not cease until it is safely lodged in the bank.

227 In *Sydney* also the master or an authorized person from the office of his agent, sees the various parcels weighed, packed, and sealed with the seals of the shipper and master. The bills of lading without the clause "Weight and contents unknown," and bearing in the margin an impression of the shipper's seal, are then and there initialed by the master, so that he may again identify them.

228 Some masters, when hoisting money, plate, or other valables, on board, attach to the boxes a buoy having a *buoy-rope* corresponding in length with the depth of the water alongside, so that if anything gives way the box can be recovered. For boxes of treasure strong nets, say of 2-in. rope, are very useful, and safer than slings.

229 Bullion is freighted from Bombay at per cent.

230 Liability does not commence in the navy until the treasure is alongside the ship, and ceases immediately it is landed. In conveying crown treasure the Admiralty allows for 600 leagues $\frac{3}{4}$ per cent; above that distance 1 per cent; belonging to other parties, gold or jewels, under 600 leagues, $\frac{3}{4}$ per cent; under 2,000 leagues, $1\frac{1}{4}$; above, $1\frac{1}{2}$; silver, under 600 leagues, 1 per cent; under 2,000 leagues, $1\frac{1}{4}$; above, 2 per cent.

231 Gold, silver, diamonds, watches, jewels, or precious stones, may be landed on Sundays, see L.

In the Court of Exchequer, June 16, 1856, *Williams v African Steam Navigation Company*, an action was brought to recover the value of a quantity of gold dust shipped from the coast of Africa. The question raised was, whether the defendants were exempt from liability under the 503rd section of the Merchant Shipping Act, which requires that in certain cases such as the shipping of gold, the shipowner shall not be liable for loss unless at the time of shipment, the owner shall have declared the nature, quality, and value of the article. In the present case the bill of lading specified the shipment of "about 1100 ounces of gold dust, value unknown." The court held that the requisites of the act had not been fulfilled by the plaintiff, and that the defendant was therefore exempt from liability. It might be that the quality and nature of the gold had been sufficiently specified, but it was clear that the value had been left a perfect blank.

232 GRAIN requires great attention in stowing; the pumps should be well protected, and the hold dry and properly dunnaged, excepting in vessels constructed with caulked ceilings. In the Mediterranean trade, dunnage, say 6 in. on the ceiling and 9 in the bilge. Mat the dunnage and sides. To prevent cargo from shifting, there should be suitable bulkheads and shifting boards, perfectly dry and well stanchioned off the side, and well plated with good cleats to keep them from working out. Care should be taken to fill up to the deck between the beams; for a hold, filled on leaving port, will sometimes be found, through settling, only seven-eighths full on reaching its destination; this will shew the necessity of particular attention to the above. If the upper part of the cargo is in bags the chance of shifting will be decreased; barrels of grain will work through to the keelson if the cargo is not previously covered with old sails, &c. Some vessels sail by the head if full laden, and require a bulk forward, that is a bulk to cut off the fore end of the hold; a bulk falling towards the bow aloft is considered less liable to be broken than if perpendicular. A few dry casks will be found very useful here. Moisture will quickly generate fermentation; and when imperfectly dried or cured, grain will become heated and damage other goods, such as moist goods, salt provisions, cotton, &c. The sudden change of temperature, when coming from a southern to a northern latitude, will produce condensation of the vapour in the hold, which will settle on the under side of the deck and fall in drops and destroy goods below. Ventilation is the best preventative.

233 A master informs the Shipping Gazette that his ship arrived from the Mediterranean with a cargo of wheat, half of which was damaged; the merchant refused to pay freight without deducting half freight for the damaged part, and asks the law of the case in the absence of any clause in the charter-party bearing on the question. The editor answers, 12th July, 1856. "Any claim for deduction of freight, on account of damaged cargo, must depend on the manner in which it became damaged, whether through any default on the part of the ship or neglect of the master, &c. Under any circumstances however, the merchant has no right to deduct what he considers proper from the freight, although it is often done upon the plea of custom or usage of the port; but before this plea can be received as a valid one, the custom must be proved, and shewn to be one within whose compass the shipowner can be included. The best course for a master to adopt is to receive, under protest, the proportion of the freight offered, and after proving, by means of a survey, that the ship is not liable for the damage or for the deduction made from the freight, proceed against the merchant for the remainder." See usage.

234 Owners are not entitled to the freight caused by increased bulk from the effects of sea water, beyond the measure at the port of shipment. Court Exchequer, *Gibson v Sturge*, June 14th, 1855; and in the case of the *Commandeur Hvidtfeldt*, tried at Cork in 1856, the master signed bill of lading for 664 kilos of wheat of good quality, Moldavian produce, dry sifted and well conditioned, shipped at Galatz. Discharged 1001 quarters. Freight paid on 949½ qrs only. Action for the difference £27 13s 8d at 10s 9d per qr. Defendants alleged that the cargo was heated and

the bulk thereby increased from 3 to 6 per cent. Galatz wheat averages 56½ to 58½; this cargo 51½. Action dismissed.

235 Some charter-parties have the following clause: "It is further agreed that should the cargo consist of wheat, seed, or any other kind of grain, in the event of the cargo, or any part thereof, being delivered in a damaged condition, the freight shall be payable upon the invoice quantity taken on board, as per bills of lading, or half freight upon the damaged portion, at the captain's option, provided no part of the cargo be thrown overboard, or otherwise disposed of on the voyage."

236 Wheat is occasionally chartered at so many pounds per bushel. Merchants sometimes allow half per cent for decrease of weight of wheat from French ports in the Bay of Biscay and the Channel, to English Channel ports. Spanish wheat, being reaped in very dry weather, is said to increase in weight when discharged in Great Britain.

237 Wheat from Odessa for Great Britain, in sailing vessels, should be shipped in the winter, in consequence of the time ordinarily occupied on the passage. If shipped in the summer, unless of very superior quality and in good order, it is almost sure to heat, and it is said, sometimes requires to be dug out of the hold. It often happens that lighters left in charge of vessels whilst loading at Odessa, meet with injury; in that case the owners of the lighters apply against the owner and recover. Cargoes of Indian corn from the Danube, and of wheat from Egypt, are battened down and every aperture closed to prevent the increase of weevil, which cannot exist without air. Indian corn is very liable to ferment through dampness when shipped, or by leakage on the voyage. The consequent evaporation lessens the bulk, and this corn shrinks considerably where wheat, under similar circumstances, swells and increases.

238 If Bengal wheat, which is of a very dry crisp character, is placed on rice or other general cargo, it is greatly injured by weevil, but when stowed below, and so covered with goods that the air is entirely excluded, it continues sound.

239 The New York Insurance offices, in 1856, limited the loading of American-built vessels, engaged in carrying grain, to three-fourths of their registered tonnage.

240 A partial cargo of grain should be covered with a layer of stout dry shifting boards, on which strong temporary stanchions should be fixed with their upper ends secured against the deck beams. Shifting boards in a green state damage all the grain near.

241 All corn, wheat, rice, pease, beans, &c, when in bulk, according to Messrs. Chapman of Liverpool, should be stowed on a good high platform or dunnage wood, of not less than 10 inches, and in the bilges 14 in. dunnage; the pumps and masts cased, to have strong bulkheads, good shifting boards, with feeders and ventilators, and to have no admixture of other goods. Flat-floored, wall-sided ships should be fitted with bilge pumps. On no consideration must the stanchions under the beams be removed.

For linseed and oats see those articles.

The following quantities of GRAIN are required to fill a keel, or 850 cubic feet, viz. 97 qrs wheat, 61 2lb $\frac{1}{2}$ bush. weighing 21 200 tons; 88 do tares, beans, and peas, 63lb $\frac{1}{2}$ bush 20 tons; 105 do rye 57lb, 21 tons; 108 do seed 52lb, 20 tons; 114 do barley, 52lb, 21 tons; 125 do oats, 37lb, 16 $\frac{1}{2}$ tons.

68 47 Quarters wheat weighing 61 $\frac{1}{2}$ th lb $\frac{1}{2}$ bush. will require a stowage in bulk, = 15 tons measurement of 40 cubic feet, = 600 cubic feet. A vessel of 245 tons register will ordinarily carry 1678 qrs wheat, 1552 qrs beans or 2108 qrs oats. A good carrying ship will stow about 50 qrs barley to every 10 tons dead weight.

The Admiralty allows 5 quarters of wheat in sacks to a ton. Bombay 20 cwt. In Australia, grain is always freighted at per bushel. At New York, 22 bushels of grain, peas, or beans in casks, or 36 bushels in bulk go to a ton.

The imperial corn bushel is 2218 192 cubic inches, which multiplied by 776, the number of bushels in 97 qrs of wheat, and divided by 1728 cubic inches in a foot, gives 996 cubic feet, which through stowage in the hold is reduced to 850 cubic feet or 1 keel.

A bushel of barley weighs 47 to 55lb; peas 58 to 64; beans 56 to 66; rye 53; oats 36 to 42; wheat 58 to 65; maize, old 58, and new 60.

Irish wheat is usually shipped in barrels weighing 280lb; barley 224lb; and oats 190lb; freight is paid by the quarter. The Glasgow boll of wheat is 240lb, barley 320lb, and oats 264lb.

An Admiralty barrel of peas contains 5 bushels or 322lb net, $\frac{1}{2}$ hhd. 3 $\frac{3}{4}$ th bushels or 240lb, and a kilderkin 2 $\frac{3}{4}$ th bushels or 161lb.

Grain, seed, &c, pay freight according to their respective weights, as compared with that of wheat, viz: beans pay 10 $\frac{1}{2}$ cent more; linseed 10 $\frac{1}{2}$ cent less; rye 7 $\frac{1}{2}$ $\frac{1}{2}$ cent less; barley 15 $\frac{1}{2}$ cent less; and oats 22 $\frac{1}{2}$ $\frac{1}{2}$ cent less.

When wheat is freighted at 10s per quarter, beans, peas, and tares should be 10/9 $\frac{3}{4}$ d, rye 9/3 $\frac{3}{4}$ d, linseed 8/11d, barley 8/6d, and oats 7/8 $\frac{1}{4}$ d. The Mediterranean scale says when wheat is 1s, beans, peas, and tares should be 1s 1 $\frac{1}{2}$ d $\frac{1}{2}$ qr; linseed and rapeseed 10 $\frac{1}{2}$ d; rye 11 $\frac{1}{2}$ d; barley 10 $\frac{1}{2}$ d; and oats 9 $\frac{1}{2}$ d.

When Black Sea Tallow is 30s per ton, wheat per quarter should be 4s 7 670d, linseed 4 2103d, peas, beans, and tares 5 1237d, rye 4s 3 494d, barley 3s 11 319d, and oats 3 7144d. See table 6, page 23.

The Baltic rates of freight for grain can be seen table 5, page 22.

RELATIVE RATES OF FREIGHT.

From The Ton 20 cwt. The Quarter 480 lb. Purcell.

TON.	QR.	TON.	QR.	TON.	QR.
5s 1s 0 ⁶	23 4 11 $\frac{1}{2}$	41 8 9 $\frac{3}{4}$			
6 1 3 $\frac{3}{4}$	24 5 1 $\frac{5}{7}$	42 9 0			
7 1 6	25 5 4 $\frac{2}{7}$	43 9 2 $\frac{4}{7}$			
8 1 8 $\frac{1}{2}$	26 5 6 $\frac{1}{7}$	44 9 5 $\frac{1}{7}$			
9 1 11 $\frac{1}{7}$	27 5 9 $\frac{2}{7}$	45 9 7 $\frac{2}{7}$			
10 2 1 $\frac{2}{7}$	28 6 0	46 9 10 $\frac{3}{7}$			
11 2 4 $\frac{2}{7}$	29 6 2 $\frac{4}{7}$	47 10 0 $\frac{4}{7}$			
12 2 6 $\frac{2}{7}$	30 6 5 $\frac{5}{7}$	48 10 3 $\frac{5}{7}$			
13 2 9 $\frac{2}{7}$	31 6 7 $\frac{6}{7}$	49 10 6			
14 3 0	32 6 10 $\frac{6}{7}$	50 10 8 $\frac{6}{7}$			
15 3 2 $\frac{2}{7}$	33 7 0 $\frac{7}{7}$	51 10 11 $\frac{7}{7}$			
16 3 5 $\frac{2}{7}$	34 7 3 $\frac{7}{7}$	52 11 1 $\frac{7}{7}$			
17 3 7 $\frac{2}{7}$	35 7 6	53 11 4 $\frac{7}{7}$			
18 3 10 $\frac{2}{7}$	36 7 8 $\frac{8}{7}$	54 11 6 $\frac{8}{7}$			
19 4 0 $\frac{2}{7}$	37 7 11 $\frac{8}{7}$	55 11 9 $\frac{8}{7}$			
20 4 3 $\frac{2}{7}$	38 8 1 $\frac{9}{7}$	56 12 0			
21 4 6	39 8 4 $\frac{9}{7}$	57 12 2 $\frac{9}{7}$			
22 4 8 $\frac{2}{7}$	40 8 6 $\frac{10}{7}$	58 12 5 $\frac{10}{7}$			

PROPORTIONATE WEIGHT OF GRAIN

B. Bush; Qr. 8 Bushels; St. Stone or 14lb.

B.	QR.	B.	QR.	B.	QR.
1b	St. 1b	1b	St. 1b	1b	St. 1b
35	20 0	46 $\frac{1}{2}$	26 8	58	33 2
35 $\frac{1}{2}$	20 4	47	26 12	58 $\frac{1}{2}$	33 6
36	20 8	47 $\frac{1}{2}$	27 2	59	33 10
36 $\frac{1}{2}$	20 12	48	27 6	59 $\frac{1}{2}$	34 0
37	21 2	48 $\frac{1}{2}$	27 10	60	34 4
37 $\frac{1}{2}$	21 6	49	28 0	60 $\frac{1}{2}$	34 8
38	21 10	49 $\frac{1}{2}$	28 4	61	34 12
38 $\frac{1}{2}$	22 0	50	28 8	61 $\frac{1}{2}$	35 2
39	22 4	50 $\frac{1}{2}$	28 12	62	35 6
39 $\frac{1}{2}$	22 8	51	29 2	62 $\frac{1}{2}$	35 10
40	22 12	51 $\frac{1}{2}$	29 6	63	36 0
40 $\frac{1}{2}$	23 2	52	29 10	63 $\frac{1}{2}$	36 4
41	23 6	52 $\frac{1}{2}$	30 0	64	36 8
41 $\frac{1}{2}$	23 10	53	30 4	64 $\frac{1}{2}$	36 12
42	24 0	53 $\frac{1}{2}$	30 8	65	37 2
42 $\frac{1}{2}$	24 4	54	30 12	65 $\frac{1}{2}$	37 6
43	24 8	54 $\frac{1}{2}$	31 2	66	37 10
43 $\frac{1}{2}$	24 12	55	31 6	66 $\frac{1}{2}$	38 0
44	25 2	55 $\frac{1}{2}$	31 10	67	38 4
44 $\frac{1}{2}$	25 6	56	32 0	67 $\frac{1}{2}$	38 8
45	25 10	56 $\frac{1}{2}$	32 4	68	38 12
45 $\frac{1}{2}$	26 0	57	32 8	68 $\frac{1}{2}$	39 2
46	26 4	57 $\frac{1}{2}$	32 12		

CORN MEASURES OF VARIOUS FOREIGN PORTS.

- ABYSSINIA. At *Gondar* the ardeb contains 10 madegas; at *Masuah* (Red Sea) 24 madegas; about 80 madegas make an English imperial bushel.
- AUSTRIA. *Trieste*; $3\frac{1}{2}$ stagas make 1 quarter.
- BELGIUM. *Antwerp*; 1015 kilos=2240 lbs.
- CANADA. The minot, an old French measure 1·0736 imp bushels, which for all commercial purposes is reckoned as 60 lbs.
- CANDIA. (Mediterranean) the carga is 4·189 bushels.
- DENMARK. *Copenhagen*; 8 scheffels=1 toende or tun; 21 tuns=10 quarters. Some calculate 208 tuns=100 qrs for wheat, and 210 tuns=100 qrs for oats.
- EGYPT. *Alexandria*; 100 ardebs wheat=63 qrs; 100 ardebs beans=65 qrs.
- FRANCE. 112 lbs= $50\frac{1}{10}$ ths kilogrammes; 100 litres=1 hectolitre; 2 hectolitres, 88 litres=1 quarter; 36 litres=1 bush; 1 Eng. ton=1015 kilogrammes.
- GERMANY. *Bremen, Hanover*; 10 scheffels=1 wisp; 2 wisp=1 last; 1 last= $11\frac{1}{2}$ qrs wheat or 11 qrs barley. *Lubeck*; 4 fass of grain is equal to 1 scheffel 0·92 bushels; 4 scheffels, 1 tonne 3·68 bush; 3 tonnen 1 drömt 11·04 bush, or 1·38 quarters; and 8 drömt, 1 last, 88·32 bush or 11·04 qrs. *Hamburg*; Last wheat, peas, beans= $11\frac{1}{2}$ qrs; barley= $10\frac{1}{2}$ qrs; oats= $10\frac{1}{2}$ qrs. *Rostock*; Last equal to 13 qrs.
- GREECE. The Kila is 0·9152 bushels or 0·1144 qrs. The starco 2·259 bush, and the ancient keramion 8·488 gals.
- HOLLAND. *Rotterdam*; Last= $10\frac{1}{2}$ qrs wheat or rye; $10\frac{1}{2}$ barley; $10\frac{1}{2}$ oats. *Groningen*; Last=10 qrs oats.
- ITALY. *Ancona*; 104 $\frac{1}{2}$ rubben=100 qrs. *Genoa*; 2 $\frac{1}{2}$ mini=1 qr. Some say 245 minas and others 248 minas=100 qrs. A quarter at *Venice*, 3 $\frac{1}{2}$ staja; at *Naples*, 5 $\frac{1}{2}$ ths tomoli; *Leghorn*, 4 sacchi.
- MALTA. The salma is 7·969 bush. 101 salma (some say 102 salma)=100 qrs.
- MOLDAVIA. *Galatz*; 100 kilos=143 qrs.
- PORTUGAL. *Viana*; 17 alquieres=1 qr; 1 moio=3 qrs.
- PRUSSIA. *Dantzic, Memel, Königsberg, Pillau*; 56 $\frac{1}{2}$ scheffels=1 last or from 10 $\frac{1}{2}$ to 10 $\frac{3}{4}$ qrs. or 84 to 86 bushels. A Last at *Anclam, Barth, Wolyast, and Stralsund*, is 14 qrs; at *Berlin and Stettin*, 13 $\frac{1}{12}$ ths qrs; and at *Wiesmar*, 13 $\frac{1}{3}$ or sometimes 13 qrs. Another authority says, at *Stettin* a last is 96 scheffels, which on discharging makes from 14 $\frac{1}{2}$ to 14 $\frac{3}{4}$ qrs. and at *Dantzic* a scheffel weighs 1·552 bushels; a last is 56 $\frac{1}{2}$ scheffels, or 10 qrs 7 bushels; 60 scheffels=11 qrs 3 bushels. A *Dantic* ship-pound is 330 lbs English.
- RUSSIA. *St Petersburg, Odessa, Riga*; 2 osmin=1 chetwert; 100 chetwerts=72 qrs. Another authority says *Riga* wheat and barley are measured 48 loops or loofs to a last, equal nearly to 11 $\frac{1}{2}$ qrs; a loop being 1 $\frac{1}{4}$ ths bush; rye 45 loops, or 10 $\frac{1}{2}$ qrs; oats and pease, 60 loops or 14 qrs.
- SICILY. *Palermo*; 4 salma of 20 tumoli, or 5 salma of 16 tumoli=5 qrs old mea.
- SMYRNA. (Asia Minor) 1 kilo=1 bushel.
- SWEDEN. 2 spann=1 tun or barrel; 18 tun=10 qrs. Some take 176 $\frac{1}{2}$ barrels as equal to 100 qrs.
- SPAIN. 5 fanegas=1 qr.
- TURKEY. *Constantinople*; 816 kilos=100 qrs. The killow contains 2023 cubic inches or 0·912 bushels.
- WALLACHIA. *Ibraïl*; 100 kilos=220 qrs. Some take 222 $\frac{1}{2}$.

242 GRAM, a grain. Bombay ton 18 cwt.

243 GRAVITY (SPECIFIC). From the following table of specific gravities, the weights of bodies may be calculated from cubical measurement. By specific gravity is meant the weight of bodies compared with similar bulks of water. Thus, a cubic foot of water weighs 1000 ounces; by reference to the table, turpentine will be found 872, meaning that a cubic foot will weigh 872 ounces; iron 7·780, meaning that a cubic foot will weigh 7780 ounces. By taking the cubical measurement of any body the weight may be ascertained by multiplying into its weight in water the number found against its name in the following table. Thus, suppose we have 100 bars of iron, each 1 inch square and 10 feet long, the cubical contents are found by multiplying 10 feet long by $\frac{1}{12}$ ths of a square foot, or $\cdot 00694$, the product being $\cdot 0694$ of a cubical foot. As a cubic foot of water weighs 1000 ounces the weight of a bulk of water equal to the bulk of the bar will be $\cdot 06944 \times 1000 = 69\cdot 46 \times 100 \text{ bars} = 6946 \text{ ounces or } 434 \text{ lb} \times 7\cdot 78$, the figures opposite in the table. The product is 3376lb.

Acid, acetic	1·062	Glass, flint	2·760 to 3·000
„ muriatic	1·200	„ common plate ...	2·760
„ nitric	1·271	Granite	2·613 to 2·956
Arsenic, sulphuric... ..	1·840	Gum Arabic	1·452
„ white	3·700	Gunpowder, loose ...	0·836
Alabaster	1·870	„ solid	1·745
Alcohol, absolute ...	0·797	Gutta Percha	0·925
Alum	1·714	Gypsum, compact or }	1·872 to 2·288
Ambergris,	0·780 to 0·926	plaster of Paris	
Anthracite	1·800	Honey	1·450
Antimony, regulus ...	6·720	Indigo	1·009
„ sulphuret	4·500	Ironstone, Carron ...	3·281
Barytes, sulphate of, }	4·000 to 4·558	Isinglass	1·111
or heavy spar		Ivory	1·825
Borax	1·714	Lard	0·947
Brick	2·000	Lead ore, Derbyshire	6·565 to 7·786
Butter	0·942	Limestone, compact	2·386 to 3·000
Caoutchouc or India }	0·983	Magnesia, native hydrate of	2·330
Rubber		Malachite, compact	3·572 to 3·994
Chalk	2·252 to 2·657	Marble, Carara	2·716
Coal	1·020 to 1·970	Mastic (a resin)	1·074
Coke	0·744	Metals, arsenic	5·763
Copal	1·045	„ brass	7·824 to 8·396
Copper Ore, yellow ...	4·160	„ cobalt	8·600
„ „ red	5·8 to 6·000	„ copper	8·900
Cider	1·018	„ gold, cast	19·258
Cork	0·240	„ iron wrought	7·780
Emery	4·000	„ „ cast	7·248
Ether, acetic	0·866	„ „ pyrites, or }	4·700
„ muriatic	0·729	mundic	
Fat of beef	0·923	Metals, iron ores ... }	8·920
Felspar	2·438 to 2·700	„ „ hematite	
Flint, black	2·582	„ „ clay	8·12 to 8·380
Glass, crown	2·520	„ lead	11·250
„ green	2·642		

Metals, lead, galena ...	7 600
" " carbonate, or }	6 500
" " dry white lead }	
" " oxide litharge 9 2 to 9 500	
" red lead 8 62 to 9 000	
" manganese, blk oxide 4 310	
" mercury	18 598
" nickel	8 279
" platina	19 500
" silver... ..	10 474
" steel, soft	7 833
" tin	7 290
" zinc, cornish	7 291
" " ore	6 700
" zinc	6 200 to 7 191
" " ore, black jack 4 000	
" " calamine	3 600
Mica	2 650 to 2 934
Mineral pitch or as- }	0 905 to 1 233
phaltum	
Naphtha	0 700 to 0 847
Nitre	1 900
Oils, aniseed	0 986
" caraway seed	0 904
" lavender	0 894
" turpentine	0 870
" hempseed	0 926
" linseed	0 940
" rapeseed	0 913
" whale	0 923
Opal, common	1 958 to 2 114
Opium	1 386
Phosphorus	1 770
Pitch	1 150
Plumbago	1 987 to 2 400
Porcelain, China	2 384
Porphyry	2 458 to 2 972
Proof, spirit	0 923
Pumice stone	0 720 to 0 914
Quartz	2 624 to 3 750
Rock, crystal	2 581 to 2 888
Salt, common	2 130
Scammony, Smyrna	1 274
Slate, (drawing)	2 110
" common roofing	2 672
Spar, fluor	3 094 to 3 791
Spermaceti	0 943
Stalactite	2 323 to 2 546
Stone, Bristol	2 510 to 2 640
" grinding	2 142
" Portland	2 496
" rotten	1 981
Sugar	1 606
Sulphate of soda or salt }	2 200
cake	

Sulphur, native	2 083
Talc	2 080 to 3 000
Tallow	0 941
Turpentine	0 872
Vinegar	1 013 to 1 080
Water, distilled	1 000
" sea	1 020
" seltzer	1 003
Wax, bees'	0 964
Wine, Bordeaux	0 993
" Burgundy... ..	0 991
" Constance... ..	1 081
" Malaga	1 082
" Port	0 997
" Champagne, white 0 997	
Wood, apple trees... ..	0 793
" ash	0 845
" beech	0 852
" box, French	0 912
" " Dutch	1 328
" Red Brazil	1 081
" Campeachy	0 913
" Cedar, wild	0 596
" " Palestine	0 613
" cherry trees	0 715
" citron	0 726
" cocoa	1 040
" cork	0 240
" cypress, Spanish 0 644	
" ebony, American 1 331	
" " Indian	1 209
" elder tree	0 695
" elm ditto	0 671
" fir, male	0 550
" " female... ..	0 498
" hazel	0 600
" juniper	0 556
" lignum vitæ	1 333
" mahogany	1 063
" maple tree	0 750
" mulberry, Spanish 0 897	
" oak, heart, 60 yrs old 1 170	
" " dry	0 930
" olive tree	0 927
" orange	0 705
" pear	0 166
" plum	0 785
" pomegranate	1 351
" poplar	0 383
" " white Spanish 0 529	
" vine	1 327
" walnut	0 681
" willow	0 585
" yew, Dutch	0 788
" " Spanish	0 807

244 GROATS. Eight sacks of Irish groats go to a ton.

245 GUANO injures the hull of a ship by saturating the ceiling if brought into close contact, but for its own security it requires a dunnage of from 12 to 15 inches; some masters recommend two feet, as it makes the cargo more secure and the ship easier at sea. Iron knees and hoops round masts (if any) should be painted or tarred previous to the reception of cargo, iron being much corroded by the action of guano. One master recommends that the whole of the main deck should be well caulked and seams paid; after which, the decks to be paid over with a good coat of Archangel tar, before leaving port, and again when crossing the tropics. Guano has a great affinity for water, and when moist, it has a tendency to undergo decomposition with the production of inflammable gases, which, mixing with the air, form a mixture liable to explosion on exposure to naked flame. It absorbs water in a very extraordinary manner, so much so, that when well dunnaged off in a dry ship, all that part near the sides becomes dark, from moisture attracted towards it; this will shew the great necessity there is for guarding the ship as well as the cargo: the pump-well should be kept perfectly clear. Guano weighs from 50 to 70 lb \varnothing bushel, and will absorb 20 \varnothing cent of water additional. A ship will ordinarily carry as much guano as coal; and if she sails well on an even keel, may be loaded almost "chock up;" if otherwise, space must be allowed for trimming.

246 The charter-parties of Messrs. ANTONY GIBBS & Co. contain the following clauses:—Owners find dunnage. Guano to be stowed so that a clear space may be left round the vessel, under the deck, for the purpose of examining the cargo and removing any water which may have been shipped; and every convenient opportunity should be taken to inspect the guano, and means used to prevent and lessen damage. The quantity shipped should not exceed one-third above the vessel's register tonnage, *n.m.* except with consent of the charterer's agents; crew to assist when absolutely necessary and receive labourers' pay; ten working days to be allowed for shipping 100 tons; in unloading, 35 tons to be discharged \varnothing diem.

247 A thin coating of gypsum or plaster of Paris moistened with sulphuric acid, laid over the top of the cargo, will, it is said, abate if not entirely remove the annoyance and danger of injury to the health of the ship's crew; it can be removed again before discharging, and will readily sell for more than its cost. The same effect may be produced by sprinkling the surface of the cargo with diluted sulphuric acid, which will not injure the guano.

248 After discharging, a ship may be rendered perfectly sweet by putting a few pounds of chloride of lime, with water, into a bucket, adding sulphuric or muriatic acid thereto. Place the bucket at the bottom of the hold, and at intervals add acid until a strong smell of chlorine issues from the hatchways. After a few hours the chlorine will be absorbed or will pass off, and the cleansing may be completed by washing with water and whitewashing with fresh lime. As the keeping of sulphu-

ric or muriatic acid on board ship, is not unattended with danger, common alum, which is in a solid form, may advantageously be used as a substitute, dissolved in water, for sprinkling over the surface of the guano, or powdered, moistened, and mixed with chloride of lime as a source of chlorine for purifying the ship.

249 An experienced officer in the merchant service says, guano should be stowed on a platform similar to that used for copper ore, or it should be well dunnaged, say as high as the kelson; then bags, say two tier fore and aft, (at the Chincha Islands bags are supplied for this purpose) so stowed as to prevent any air from being drawn through by the suction of the pumps, or the powder or loose guano from finding its way between. The ship's sides should be well dunnaged, say not less than three inches; and a tier of bags carried up to the lower beams; the hold stowed so that a man can go on and around the cargo daily to watch if any drainings are visible from the deck, and if so, the wet spots should be taken up immediately, as a small portion of water will dissolve a large quantity of guano. On no account should the crystallized part of the guano be stowed among the cargo, but separately, in casks; several fatal accidents are said to have occurred to vessels from Patagonia, through not taking this precaution. The cargo should not be interfered with after it is stowed, for the article will lose a portion of its quality every time air is admitted, as well as evaporate and decrease in bulk. It is very rare that a vessel will carry her hold full, and it is seldom that a ship will turn out what she takes in.

250 Good guano is the excrement of sea fowl and seals, allowed to accumulate in countries where there is no rain. It owes its virtue as a manure, first to the presence of ammoniacal salts, and secondly to that of the phosphate of lime or bone earth, derived from the bones of fish.

251 To test the ammonia, put a spoonful of guano and a spoonful of powdered quick lime in a mortar, and rub them with the pestle for a few seconds; if the guano be genuine the smell will resemble that of a bottle of salts, and will make the eyes water in the same manner. In this way it may be proved whether the sample be guano or not, and the strength of different samples may be estimated by the comparative strength or effluvia of the ammonia disengaged.

252 To test for the phosphate of lime, place a small quantity (say 100 grains) in an iron ladle or earthenware pipkin, or any similar vessel, and heat it red hot over a clear fire for 20 minutes; if the guano is genuine it will be reduced to a white ash weighing about 35 grains; if the 100 grains, when burned, weigh much more than 35 grains, the guano is not genuine, or contains an undue proportion of sand or similar matter.

253 The ashes from genuine guano will be found to be phosphate of lime, nearly pure. If it be required to prove this, a small bottle of acetic acid or white vinegar will dissolve the phosphate and hold it in solution, leaving the silica and alumina (probably amounting to 3 or 4 grs) undissolved. The ashes should be left in the acetic acid for two days, and the bottle shaken occasionally. It is assumed that the guano to be tested is dry.

Composition of good Peruvian Guano.

Water	17'400
Organic matter and ammoniacal salts *	49'970
Phosphates of lime and Magnesia (bone earth)	23'660
Alkaline salts, chiefly chlorides of potassium and sodium	7'430
Sand	1'540
	<hr/> 100'000

* Yielding Ammonia 18'96.

It may be considered a good guano if not containing more than 14 $\frac{1}{2}$ cent. of ammonia.

254 Guano is injured by contact with salt, nitrate of soda, &c, and it injures almost every article of human consumption, on account of the large proportion of ammonia which it contains; it will turn nuts, leather, &c, almost black. Good coasting vessels may not require dunnage, (see dunnage) but they must carefully avoid stowing general goods in the same hold, particularly delicate articles such as tea, coffee, chocolate, &c.

255 GUMS. Pure gums are soluble in water. Dunnage 9 inches, sides 2 $\frac{1}{2}$. The East India Company allows 16 cwt. gum arabic, elemi, myrrh, lac, ammoniacum, and tragacanth, to a ton, for freight; gum surcocoal 18 cwt, Benjamin 20 cwt. Bombay,—Arabic animi, Benjamin, bdellium, copal, gamboge, elemi, olibanum, tragacanth, myrrh, mastic, &c, in chests, 50 cubic feet. An East India chest of gum arabic weighs 6 cwt; a Turkey chest 4 cwt.

256 GUNNY BAGS are much used in the E. Indies for covering goods and packages. If a large number are heaped together and they become damp, spontaneous combustion will be produced.

257 GUNPOWDER. During its shipment all fires, lights, and smoking, should be strictly prohibited. The packages should be carefully handled, especially in the vicinity of iron, and stowed immediately on reception. Should there be no regular magazine a temporary one may easily be constructed among the cargo least inflammable, and as remote from iron as possible, by flooring over a sufficient space, bulkheading it round, and lining the interior with blanketing or other woollen stuff, being careful to close all openings, particularly in the flooring, to prevent any loose powder which may escape from the packages, finding its way among the other cargo. The magazine should be constructed near a hatchway for facility of access in case of fire, and convenience of stowing and discharging; powder generally being the last thing shipped and the first discharged. In some ports it is imperative to give notice to the authorities, and to land powder within a stated time, before landing any other cargo, under penalties.

258 In the African trade, a ship of 700 tons takes about 35 tons gunpowder, deposited in a magazine constructed by a bulk-head in the lower hold, across the run, decked over with a scuttle-hatch having leaded seams.

259 A shipmaster is liable to a penalty of £20, besides 2s. for every pound of gunpowder not delivered into a licensed magazine, which is, in all cases, two miles at least from a church. See ammunition.

A Hanoverian master writes to the Gazette, Jan. 5th, 1857: I beg to submit the following question:—My vessel of 105 tons register, and about 150 tons burthen, is chartered to load, in the port of London, a cargo of lawful goods and merchandise, as the charterers shall tender alongside for shipment. Having received about three fourths of my cargo in the London docks, I am now directed to proceed to Purfleet to receive 1,200 casks of powder. There being no clause in my charter which would lead me to believe that I had to load at two different places, and knowing that in the London docks no powder is allowed to be shipped, I did not think of using the precaution especially to exclude it. I therefore desire to know whether my charterer can insist upon my taking powder on board under the name of lawful merchandise, and if so, what quantity of this dangerous article you would consider to be in conformity with the custom of the port, for a vessel of my size? The editor answers,—Although, by the Custom's Consolidation Act, gunpowder is not unlawful merchandise unless made so by proclamation, still, by the Merchant Shipping Act of 1854, section 329, no person is entitled to require the master or owner of a ship to carry gunpowder or any other goods, which, in the judgment of such master or owner, are of a dangerous character; and presuming that the charter-party was made here, the master has the power, under this act, to refuse to take gunpowder on board.

2,000lb go to a ton for freight; in Australia it is freighted by measurement, at double the ordinary rates. A barrel contains 100lb, half ditto 50, quarter 25. A last is 24 barrels.

260 GUTTA PERCHA, a vegetable product obtained from trees in Borneo, Malacca, Singapore, &c. It is highly inflammable, but impervious to water or damp, and is generally taken with other goods, say 200 tons in a ship of 800 tons burthen. Dunnage with wood and mat the sides; in a raw state it contains foreign substances, such as wood, bark, &c. which will absorb water, or very little dunnage would be necessary. Gutta Percha is stowed in bulk, excepting the small pieces which are in bags. It is liable to be damaged by any sticky goods such as cutch, gambier, sugar, tar, &c. and will injure tea, rice, and other delicate articles.

261 HAMS from Ireland are usually packed like bladder lard, in casks, on the heads of which the number and weight of contents is generally marked; the cask and packing is not included in the weight; the freight is therefore calculated on the nett weight. See bacon.

262 HAY requires a full amount of ballast; dunnage with board in the wings. Hay in a damp hold is liable to become over heated, and should be stowed so as to allow a current of air to pass from one hatchway to another. A government officer recommends a large cargo to be divided about half way up, and a space of about a foot to be kept clear with old spars or other dunnage, laid fore and aft. There should also be a well of about four bales space, kept clear from the upper deck to the bottom of the ship.

On the 16th January, 1856, the ship *Marathon*, from Bristol, with 700 tons of hay for Constantinople, out 30 days, having been as far as 13° West, put into Plymouth, leaky. Her cargo had become so much heated, that for many days the crew had been driven from the forecabin to the cabin; and the hatches of the forecabin, and the hold, the chain boxes, and every aperture communicating with the cargo, had been carefully battened down and covered with tarpaulin, to prevent the hay from bursting into a flame.

The Admiralty allows 500lb pressed hay to a ton. Ordinarily, compressed hay in trusses measures about 2ft. 4in. \times 2ft. 6in. \times 3ft. 0in. and will average about 270lb Φ truss, occupying say 140ft. per ton for stowage, which hydraulic pressure will reduce to 105ft. Φ ton.

Hay and Straw. 36lb make 1 truss of straw; 56lb 1 truss of old hay; 60lb 1 truss of new hay; 36 trusses 1 load; 18 cwt 1 load of old hay; 19 cwt 32lb 1 load of new hay; 11 cwt 64lb 1 load of straw; 1 square yard of new hay 6 stone, oldish hay 8 stone, and old hay 9 stone. Hay is considered as new for 3 months, and is called old on the 1st September.

263 HARE SKINS. 3,500 go to a ton. The Baltic rate is the same as for clean hemp per ton.

264 HEMP should be dunnaged about 9 inches on the floors, and to the upper part of the bilge; the wing bales of the second tier kept 6in off the side at the lower corner, and 2 $\frac{1}{2}$ in. at the sides; sharp-bottomed ships one-third less dunnage in floor and bilges. Hemp, being light and bulky, is forced into the hold by screws, which renders the operation rather slow; the stevadores require to be well watched or there will be great loss of stowage.

265 Particular care must be taken to ship hemp and flax in fine dry weather; if it gets wet it heats and is totally spoiled; for this reason every vessel must be furnished with mats when loading. In some Russian ports the ship is ballasted with bar iron, stowed crossways so as to admit the air, on layers of light wood for dunnage; the iron is covered with mats to receive bales, and in large ships they are covered with mats to receive a second ballasting of iron.

266 Oil, especially linseed oil and tar, if allowed to leak on hemp, may produce spontaneous combustion. A ship discharging Venetian hemp at the Devonport Dockyard, in 1855, was put under detention in consequence of the discovery of some stray lucifer matches in her cargo, supposed to have been dropped by the stevadores. See flax.

The following quantities are required to fill a keel of 850 cubic feet, or 97 quarters wheat, viz: 10 tons clean hemp and flax; 9.107 outshot ditto; 7.760 half clean ditto; and 5.825 codilla.

44 Poods gross Russian clean, go to a ton for freight. At Bombay 50 cubic feet sunn go to a ton; for mode of measurement see bale goods. At Calcutta 15 cwt. or 48 cubic feet. E I Co. 50 cubic feet pant hemp. Manilla is mostly shipped by weight; when sugars are freighted at 10 dollars Φ ton of 20 cwt, hemp and other light freight are rated at 12 dollars Φ ton of 40 feet.

When wheat is 10s Φ quarter freight, clean hemp and flax should be £4 17 0 Φ ton; outshot £5 6 11 $\frac{1}{2}$; half clean £6 5 0; and codilla £8 6 4 $\frac{1}{2}$. Another authority says, when Mediterranean wheat is freighted at 1s Φ quarter, clean hemp should be 10/6 Φ ton of 20 cwt; outshot should be 1 $\frac{1}{2}$ th; half clean 1 $\frac{1}{2}$ ths; and codilla 1 $\frac{1}{2}$ ths more than clean hemp Φ ton of 20 cwt.

A stone of hemp is 32lb; a bale nearly 20 cwt; a bundle of St. Petersburg clean hemp weighs from 55 to 65 poods; outshot 48 to 55; half clean 40 to 45. A pood weighs 36lb avoidupois; 63 poods an English ton. A ton will occupy 88 cubic feet. A bale well screwed averages 2 $\frac{1}{2}$ feet thick, 5 feet high, and 7 feet long.

267 **HERRINGS** should be stowed the same as a wet cargo, say wine or oil, for which see casks, liquids, and oils; the ground tier to be made square; small casks at each end; keep as level as possible to come in for heights at top. In general cargoes avoid stowing red herrings so as to leak on perishable goods.

180 Barrels red herrings weighing 11 tons, or 144 white 21½ tons, will occupy a space of 850 cubic feet or one keel. When wheat is 1s per quarter freight, red herrings should be 6¼d and white 8d per barrel.

A last of white herrings is 12fb; a barrel 26½ imperial gallons; a cran 37½ ditto; a measure 600 fish; and a cade 500 fish. In some places a last consists of 20 cades, each cade a 1000, and every 1000 ten hundred, and every 100 five score; 18 barrels of unpacked herrings make a last.

268 **HIDES.** In the River Plate, pipes of tallow are ordinarily stowed on the ground floor, with a layer of bones or horns to receive hides, otherwise there should be at least 8 or 9 inches of level dunnage in the bottom, with two or three inches in the wings, and a single spread of hides nailed up and down to keep the dunnage in its place. When stowing at Buenos Ayres, Rio Grande, and Monte Video, great care is taken to maintain an exact level with every layer, if any inclination, let it be towards the middle, in order to keep the pickle among the hides; some masters object to this as it tends to decrease the quantity of hides which could otherwise be shipped. Where it becomes necessary to turn in a part of a hide, the turning should be carefully supplied with salt and pickle to prevent decomposition. Hides will quickly decompose if allowed to touch any article not of a kindred character, such as bones, horns, &c. They will be burnt by turpentine and stained by oak wood, both of which, like iron, require to be well dunnaged with bones, horns, &c. Careful masters gather all the stray salt after loading, and on the passage home convert it into pickle, and throw it occasionally over the hides; this preserves them and makes them turn out better on discharging.

269 When wetted with sea water, a foetid odour arises and injures other goods, especially if stowed over the hides; in the case of *Montoya v London Assurance Co.* 6 Exch. 457, the underwriters were held liable for injury thus caused to tobacco.

270 One firm, long experienced in the trade, and possessing ships of their own, deliver to masters the following instructions for stowing salted hides.

1st.—The ship to be well dunnaged with either horns or bones to the level of the keelson; the dunnage to be continued up the sides of the vessel, of the thickness of at least two horns or bones, taking care that in no case any hides touch the sides or skin of the ship.

2nd.—If it be possible let the whole length of the hold be stowed in one bulk, without any breaks, except those at the masts and pump cases, which parts, as well as the beams of the vessel, to be dunnaged as directed; should there be a necessity for the separation of bulks, the space between to be filled with salt and carefully covered over, to prevent water, from leaky decks or otherwise, from getting down between the bulks.

3rd.—The hides to be laid out perfectly flat and level, and each hide to be copiously supplied with both salt and strong pickles, and not to be doubled or folded, except when unavoidably necessary, for the keeping the bulk level, and at the fore and after ends of the ship, and when folded the folds to be well pickled and salted.

4th.—The top of the cargo to be left perfectly level, so that salt and pickles may be applied to it during the passage home; the captain taking care to retain from 15 to 20 cwt of salt for that purpose.

5th.—During the passage home, the after and fore hatches to be kept off, when the weather will permit, and thus allow the steam of the cargo to escape. If these instructions are attended to, and the top of the cargo kept strewed with salt, there will be no damage.

271 In stowing California hides, Dana says, the ballast is levelled off just above the keelson and dunnaged. When within four feet of the beams a pile is raised in the after part, close against the bulk-head, and crowded in by hand and by oar. Then a large book of 25 to 50 hides, doubled at the back, receives the sharpened ends of two long heavy spars to which straps, tackles, and purchase-blocks are fitted, and all hands take the falls, and the book is well entered. The tackles are then nipped, straps and toggles clapped upon the falls, and two more luff tackles hooked on, and thus, luff upon luff, where one hide could not be forced by hand, a hundred are often driven; although the beams may be started by the power used, the cargo will loosen before rounding Cape Horn.

272 A ship will carry about half her burthen of dry hides, for which the freight is generally double that of wet salted hides.

17 tons salted hides occupy 850 cubic feet or 1 keel.

At Bombay 50 cubic feet of screwed hides and skins, and 12 cwt. of unscrewed and loose, go to a ton. At Calcutta, 45 cubic feet, or 14 cwt well screwed hides, go to a ton; if badly screwed near 60 cubic feet. Manilla hides are shipped by weight. In Australia, 20 cwt go to a ton for freight. At Bahia, 12½ cwt dry, 16 cwt dry salted, and 20 cwt green. At New York, 10 cwt dry hides go to a ton.

Dried Baltic hides receive ⅔ths more than freight of clean hemp ⅔ ton gross; wet or salted ⅓rds freight of clean hemp ⅔ ton gross. When wheat is 1s ⅔ quarter freight, dried hides should be 13/4d ⅔ ton.

A dicker of hides consists of 10 skins, and a last of 20 dickers. In some places 12 dozen skins make a last.

273 HONEY. New York ton 20 cwt. A gallon weighs 12lb.

274 HOOPS. For Admiralty quantities to a ton see tonnage tables, Nos. 2 and 3.

275 HOPS will damage by damp, and should not be stowed near any description of goods likely to heat; they will also damage by being exposed to the air, and cannot be too closely confined in the ship's hold.

A pocket of hops, of good quality, well cured and tightly trodden, will weigh about 1½ cwt, and a bag about 2½ cwt. In Australia the ton for freight is 40 cubic feet.

276 HORSES, on board government sailing transports, are berthed in the hold on shingle ballast, in separate stalls, their heads towards each other amidships, where there is as large an avenue as can be obtained for light and ventilation. Two or three spare stalls are kept for convenience, when cleansing those in use. Arrangements are made for sustaining them occasionally on bands fixed to the deck above. Great care should be observed to prevent fire; in Dec. 1854, the barque *Europa*, with horses for the Crimea, was totally consumed by fire, in the Bay of Biscay.

Baron Alderson decided, Jan. 13, 1855, in the Exchequer Court, *Gibson v Sturge*, freight is payable only on those animals brought alive.

277 HORSE HAIR, Baltic manufactured, receives double freight of clean hemp $\frac{1}{2}$ ton of 44 poods gross; manes $\frac{1}{4}$ th more; tails same freight as clean hemp per ton of 44 poods gross.

278 HURTALL, at Bombay 50 cubic feet go to a ton.

279 HOOFS and HORNS. At Bahia, 10 cwt. of hoofs and 3 mil of horns go to a ton. At Rio Grande and Buenos Ayres, 2 mil of horns.

280 ICE, at Boston, U.S. is sawn into square blocks not less than 12 inches thick. The holds have a space between the planking of the ship and the ice, boxed in and filled usually with sawdust or some other substance reckoned a non-conductor of heat. Bulk-heads and hatches are closed as tightly as possible to prevent the admission of heated air, which will diminish the cargo and endanger the safety of the ship.

281 IGNITION. But little danger is likely to arise from the ignition of commonly known inflammable substances, as precautions are generally employed; but safety may be further insured by adopting as a rule, easy of application, that whenever it be necessary to take a light into the hold amongst inflammable bodies, that of course it should be in a lantern and preferably an oil lamp, but that it should always be accompanied with a wet bag or cloth which by prompt and judicious use, may be made the certain means of instantaneously extinguishing any fire produced by accident to the light.

282 But certain substances well known to be themselves inflammable are not so well known to give off invisible gases or vapors which are capable of being ignited by contact with flame at a considerable distance from the bodies themselves. Such are some sorts of coal (as noticed elsewhere), spirits of wine, brandies, rum, gin, whiskey, æthers, chloroform, and all distilled alcoholic fluids, as well as pyroxylic spirit or wood naphtha, benzole, or coal naphtha, and camphine, or turpentine. Numerous and most serious accidents have arisen from the ignition of the vapor of spirits when being drawn off for the ship's use. In case of breakage of any package containing any of these fluids, the vapor should be gotten rid of by active ventilation, and on no account whatever should it be approached with any other light than that of a collier's safety lamp. The continuous emanation of vapour from spirits may be prevented by mixture with water.

283 For coals and all other bodies liable to the evolution of inflammable vapors, the prevention of danger may be best secured by attention to ventilation, which see.

284 INDIGO. Dunnage 9 inches, sides 2½. The chests are not always tight enough to prevent the escape of fine dust, which is very liable to discolour and greatly injure rice, sugar, &c. Being light freight, it is often stowed on the top, and sometimes has to be moved frequently from one part of the hold to another, before final stowage. Cargo should be previously covered with double or treble mats or loose dry hides, to receive the waste of these chests; and on discharging the coverings should be taken off carefully to prevent the dust from falling among the cargo. Boxes should be closely inspected before shipment, to see they are tight.

At Bombay, Calcutta, and Manilla, 50 cubic feet go to a ton; the weight from 15 to 16 cwt. It used to be packed in chests nearly of uniform size, viz, 18×24×36 inches, so that when covered with gunny bags, five chests measured about 50 cubic feet, and were taken as a ton. 3½ maunds weigh 260 lb. At Guatemala a seron weighs 250 lb.

285 IRON, Bar and Railway. Protect the ceiling from chafe by putting three rows, with their ends shifted, between it and the bars. One master says then lay faggots or wooden slabs with 3 or 4 tier of iron on them, and so on, rising in a heap towards the main hatchway. Another says, bar iron should be stowed diagonally (grating fashion) bringing it up pyramidically from the ends; this is the mode at Newport and Cardiff. At Porthcawl they stow light some way, say one third, up the cargo, and then solid, say one fourth, and the remainder light; this mode has been found very advantageous for loading, sailing, and unloading the ship.

286 An experienced stevadore recommends faggots about 18 inches thick, to be laid athwartships, from the kelson to the sides. Iron fore and aft, solid or close together. Next tier angle-fashion, towards the kelson and the wings, pigeon-coated, that is about four inches from bar to bar. Third tier crossed the opposite way, to form a diamond in the openings. Then fore and aft solid, and so continue two tiers open and one solid, until three-fifths of the cargo is in, finishing with a solid tier. On this dunnage with a layer of faggots, as below. Then one tier solid to two open, until the cargo is complete. See hemp and metals.

287 The keels and kelsons of iron-laden ships have been sometimes injured when they have taken the ground, in consequence of all the weight being placed on the frame of the ship and none on the kelson. Care should therefore be observed to lay the bottom iron as high only as the top of the kelson, so that the first thwartship tier should have a bearing on it; the kelson would thus sustain a fair proportion of the weight of the cargo.

In 1854 the schooner *Pearl* left Bristol with railway iron for Alicante; her beam was narrow, the cargo shifted, and she put back. When re-stowing the last 5 or 6 tiers the master crossed the rails, burton fashion, from side to side, with 2½ in deals, one at each end of the rails; the deals were not placed directly over each other; by this means the upper part of the cargo was securely bound together, as iron will not slide on wood like it will on iron. It may be also necessary to tie together the ends of the bars at the bow and stern with chain or rope, over and under, and to secure the top tiers with chains round lower beams.

In the case of the *Trafalgar*, *Ritson v Tyre*, Liverpool, Aug. 27, 1855, the owner was held liable for damage to casks of porter stowed below 200 tons of heavy goods consisting of iron and boxes of bacon.

288 IRON and SHINGLE. Iron ballast is first stowed fore and aft, from bulk-head to bulk-head, according to the requirements of the ship; then the shingle ballast is spread, and levelled over the iron. BRADY says "the rust should be well beaten off from iron ballast, and each pig whitewashed; then place hoop poles athwart ships, for dunnage, as near to each other as possible, so that each pig of iron will rest at least on two of them." The Admiralty prefer using white-wash made with salt water.

CAST IRON BALLAST, (ADMIRALTY) EACH FIG.

LENGTH		BREADTH	DEPTH	WEIGHT	NO. TO A TON
ft	in	in	in	cwt q lb	Pigs
3	0	6	6	2 8 12	7
2	0	4	4	.....	20
1	6	6	4½	1 0 12	21
1	6	6	3	.....	28
1	5½	5	4½	1 0 18	18
1	5	5½	4½	1 0 0	...
1	4½	5	4	.....	20
1	0	4½	4½	0 2 0	...
1	0	4	4	.....	40

The E.I.Co. allows 20 cwt. to the ton; New York the same.

A stone of iron 14lb. 75lb iron at Stockholm are equal to 56lb English.

289 ISINGLASS, Baltic, in bales, receives same freight as clean hemp ½ ton of 44 poods gross; in casks ¼th more than freight of clean hemp ½ ton of 44 poods gross.

290 IVORY. 50 cubic feet of elephants' teeth in cases, and 16 cwt in bulk, go to a ton at Bombay. A tusk averages 60 lb.

291 JACKWOOD. Bombay ton, 50 cubic feet.

292 JUTE consists of the fibres of two plants, the chonch and isbund, which are extensively cultivated at Bengal. It has a great tendency to swell, and there is some degree of danger in taking a full cargo, especially if damp, or if the ground tier becomes wetted. Formerly it was the practice when silk, indigo, or other light freight could not be obtained, to take in jute at a less rate proportionately, and to make up by quantity, for the deficiency; many ships thus crammed were totally destroyed through spontaneous combustion, especially if taken in during the rainy season. Where the previous heated state of the jute has been observed, and the fore and aft hatches have been opened, and windsails let down, while passing through the tropics, the ship has been saved. When a portion only of the cargo consists of jute, due regard should be paid to its position in the hold, on account of this dangerous property.

At Calcutta 5 bales, weighing 15 cwt, and measuring 46 cubic feet, go to a ton for freight; when badly screwed, 50 cubic feet; when shipped by measurement only, 50 cubic feet compressed, in bales, weighs sometimes 17 cwt. Another authority says, a ton of Jute weighs 10 cwt, and measures 50 feet. At Manilla it is shipped by weight.

293 KING'S YELLOW and Orpiment, being a sulphuret of arsenic, is a poisonous material. 20 cwt. go to the ton at Bombay.

294 LABRADOR and Newfoundland Trade. After describing the best mode of loading salt, which will be found under that heading, a gentleman of twenty years' experience recommends the management of a vessel of say 120 tons as follows.

295 When chartered for the United Kingdom, you will probably have oil and blubber as well as fish; ascertain how much there is of each, the sizes of the casks, &c. The oil and blubber may go in the fore hold; as there is generally room left forward, if loading all fish, should there be a full cargo, some ballast will be required forward among the blubber and oil, to keep the vessel in trim; as the blubber and oil take more room than the same weight in fish, there will be a chance of filling her up forward. Arrange the after ends of the casks in a tier, as they will not then overhang or leak on the fish in the main hold. Blubber should be put below, as it is heavier than oil, and the casks more likely to burst; a puncheon of blubber should be at least 4 inches out — commonly called dry inches; remove the vent plug when the cask is stowed, and do not replace it. Should the cask have been rolled any distance, remove the vent plug to let out the air and replace it before slinging; casks often burst for want of this precaution. The vent plugs of the oil should be taken out for awhile, when they are stowed, and then replaced; these should be an inch out (dry inch) at least; for if the oil is new and the cask full, it is likely to burst. Let them all be well bedded and quoined, and secure each tier with salted seal skins, hides, old junk, or firewood. If the blubber is *well* boiled before it is put into the cask, it is not so likely to work, and the cask may be filled to within 2 inches.

296 Should the vessel be crank or likely to load by the stern, place ballast under or among the ground tier forward. If the vessel is by the head, the casks can be worked forward easier. Avoid lowering casks down the main hatch, for if fish is stowed there and the gear gives way, or a cask bursts, the consequences will be serious; do not use can-hooks. When there is blubber and oil enough to make the vessel safe, land the remainder of the salt, (see the article salt) dry the hold, and lay the longering, (small firewood, sticks, &c.) fore and aft, next the keelson; and along the bilges lay stout longers, to enable blubber from a bursted cask to find its way to the pump-well.

297 Dunnage generally consists of boughs of the spruce tree, cut after fine dry weather. A tight vessel will require 6 inches on the bottom, and 9 on the bilges, and so taper off; dunnage most where water is likely to lodge; take the depth by measuring under your feet to the ceiling; lay it athwart the longers, as it will take less and leave the openings free for the passage of liquids. Cover the dunnage with rinds; the lower line of fish will then turn out nearly as well as the other parts, otherwise it will be damp.

298 Place rinds up and down the sides by securing the upper ends to the stringers or clamp pieces under the deck beams; let the upper ends come far enough out under the deck to catch leakage from the water-ways, which will then descend to the next rind and so on to the bottom; the rinds should overlap each other an inch or more. Place

the rough or outside, being waterproof, next the ceiling; by keeping the inside, which should be perfectly free from sap, next the fish, it will give the hold a cleaner and lighter appearance; the outside blisters contain turpentine which will impart to the fish an unpleasant flavour. Many, however, prefer placing the inside of the rinds next the ceiling; they are more easily fixed that way on account of their inclination to roll up.

299 For securing the rinds to the sides, sennet, stout spun-yarn, or old straight wooden hoops, used batten fashion, will do; fastenings in the middle and at each end may be sufficient, but they should be well secured, for if after discharging the fish the vessel should load a cargo requiring mats, the rinds may answer that purpose. Against the heads of the casks place sprigs of dunnage, with rinds water-shoot, on them. The custom is not to rind on the dunnage for the bottoms, (some ships with caulked ceilings do not use rinds when ship and cargo belong to the same person) but to place the rinds fore and aft, overlapping, to carry the water down between them and the sides, and to place them along as the fish come up the hold, without fastening. The objection to this is, that if the vessel is laden quickly, and gets into a rough sea with a fair wind, she rolls from side to side, and the fish not having settled, the rinds will slip down; or, if she is on a wind, with a strong breeze, the fish settle off from the weather side, the rinds fall and are found in the bilge. Scupper nails will prevent this, but many will be required, as a vessel of 120 tons will take from 700 to 800 rinds. It is usual for the shipper to find rinds and dunnage, wood, &c, for stowing oils, &c. and for the ship to find longerings.

300 Should the fish not fill up to the deck, spread spruce boughs, old spare sails, &c, on it, and let a man go occasionally into the hold, and secure a bucket under any leak which cannot be stopped, and lay swabs, canvas, bread bags, &c. to prevent water from working into the cargo. Keep the pumps well watched, for a very little water will, by the vessel's motion, cause a damp air to pass and re-pass continually, and a fish cargo cannot be kept too dry. If once a vessel gets a good name for fair passages, and for delivering cargo in good order, it is of great consequence both to the owner and master.

301 In stowing, commence by laying the first tier or line of fish face up and heads aft; the next tier back up and so on, laying them regularly fore and aft, and as you come along the sides place next the rinds the skinny parts, which are better able to bear the wet in case of leakage. Some prefer placing the edges there because they consider the possible darkening of a dozen fish, about a quarter of an inch each, less injurious than the entire loss of one. Keep the fish solid all along the sides to prevent cargo from working. In filling up avoid what is called longerings or bulking; fill right up to the deck in lines which can be done by bringing three or four lines along together like steps; the fish turn out better than when in small bulks or longers. Avoid separate bulks; at all events do not bring them to the top separately, as the damp air will get between and spoil the appearance of the fish. When there is not a full cargo bank up in the centre to prevent shifting at sea.

302 If taking a cargo, all fish, consider how the vessel will load, and act accordingly; say, if to fill her up she would load by the head, first have a bulk in the after hold, and to give it time to settle stow forward till you come up as high, or a line higher, than it, then stow fore and aft. If it is desirable for the vessel to take all she can and turn her cargo out well, stow the fish singly, and the lines not too thick or stiff; but if you wish to blow her up, stow three or four fish at a time, and carry along stiff lines. It is usual to begin aft and go on forward, then turn and come aft again, then forward and so on. In a crank or deep vessel use stone ballast instead of longering, otherwise, if laden quickly with dry fish, she will not be sufficiently stiff to carry her canvas in a breeze.

303 A certain schooner of 80 tons will take 2,100 quintals of dry cod fish, but is obliged to have 10 tons of iron ballast, and is not then stiff enough until she has been to sea a few days, and the cargo is settled.

304 A vessel of 120 tons register will take say from 95 to 100 tons of oil, or 2,800 to 3,000 quintals of Labrador fish, or 2,500 to 2,600 Newfoundland fish. When it is expected to load a cargo of oil, some ballast must be secured for the ground tier, unless there are salted seal skins, hides, and old junk enough for the purpose.

305 With larger ships, of which there are many, of from 250 to 300 tons, it is frequently possible to discharge from one hatch, and load at the others; these vessels are mostly employed in the Brazil and West India trades, and load fish in drums or casks, not so long but nearly as large as flour barrels; they contain a Portuguese quintal of 128 lbs of fish.

306 When discharging fish, cover the cargo fore and aft every time the hatches are put on, to prevent the damp air from injuring it. See the articles fish, herrings, and pilchards.

307 LAC DYE. E.I.Co's ton 50 cubic feet, weight 18 cwt. Calcutta same. A chest weighs 4 cwt.

308 LAC LAKE. E.I.Co's ton 16 cwt; Bombay 50 cubic feet.

309 LAMP BLACK, recently made, is liable to spontaneous combustion without the admixture of oil; with oil the danger is imminent, whether recently made or otherwise. Agree for gross weight if possible, as the tares are very great. Bags of lamp black are represented as being very useful to fill up, and from their lightness can be placed where some descriptions of goods will not answer.

20 Hogsheads weighing 7 tons, or 120 bags 6 tons, occupy 850 cubic feet or 1 keel. When wheat is 1s $\frac{1}{4}$ quarter freight, lamp black should be 4/10 $\frac{1}{4}$ d $\frac{1}{2}$ hhd and 9 $\frac{1}{4}$ d $\frac{1}{2}$ bag.

310 LANDING GOODS. DANA says, the landing of the cargo upon the wharf is a sufficient delivery, if due notice be given to the parties who are to receive them. The master is not, however, bound to deliver until the freight due is paid or secured to his satisfaction, as he has a lien upon the goods for his freight; but the consignee can require the goods to be taken from the hold, in order that he may examine them before paying freight. In such case they should not go out of the possession of the master or his agents.

311 Where no one will become responsible, a master may deliver a bag, bale, or ton, as the case may be, and be paid freight thereon before he delivers more. At the London and other docks and wharves, it is the practice of the ship's brokers to send a printed notice, duly signed, to stop all goods for freight; they are retained by the Company until the broker sends a release or a person authorised to take off the stop.

By 16 and 17 Vic. c. 107, sec. 49, no goods, except diamonds, bullion, lobsters, and fresh fish, are to be unshipped or landed on Sundays or holidays, or on any other day except between the hours of 8 a.m. and 4 p.m. from the 1st of March to the 1st November; and between the hours of 9 a.m. and 4 p.m. from the 1st November to the 1st March (except free goods) unless special leave be obtained from the Custom-House. The goods are liable to forfeiture unless removed in the presence and with the authority of the officer of Customs.

Free goods are allowed to be landed from 8 a.m. to 8 p.m. from March to November. Although they pay no duty, goods are not considered free until examined by the Customs and passed. Cattle are landed at any hour of the day or night, if passed by a veterinary surgeon.

312 LAPIS LAZULI, or Ultramarine, a very fine blue powder, and a mineral of great value. E. I. Co's ton 20 cwt.

313 LARD is often stowed to fill up breakages, by which heavy articles sometimes press on it and force out the heads of the kegs. It is considerably injured by salt water, and should not be placed near guano, sugar, cotton, flour, wheat, &c. In steam-ships, keep well off from the bulk-head of the engine room. See butter, candles, general cargo, hams, &c.

314 LAST is sometimes used to signify the burden of a ship; it is an uncertain quantity, varying in different countries, and with respect to different articles; generally, however, a last is estimated at 4,000lb, but there are great discrepancies. The following quantities of different articles make a last, viz, 14 barrels of pitch, tar, or ashes; 12 dozen of hides or skins; 12 barrels of cod fish, potash, or meal; 20 cades, each of 1,000 herrings, every 1,000 ten hundred, and every 100 five score; 10½ quarters of cole-seed; 10 quarters of corn or rape seed—in some parts of England 21 quarters of corn go to a last; 12 sacks of wool; 20 dickers (every dicker twelve skins) of leather; 18 barrels of unpacked herrings; 10,000 pic/hards; 24 barrels (each barrel containing 100lb) of gunpowder; 1,700lb of feathers or flax. A Netherlands' last for tonnage is considered equal to two tons British. The quantity forming a last, will, in several instances, be found under the head of each article in this work.

315 LAZARETTO is a part of the lower deck, parted off for the reception of provisions and stores; it is generally under the cabin.

316 LEAD. When pig lead only is taken, dunnage say with coal or rubble, until the keelson is completely covered, in order to raise the lead and make the ship easy at sea. Lay plank, and stow in the middle in stacks, by placing the pigs three or four inches apart, and crossing at the same distance. Large billet wood makes good dunnage, stowed between. See copper, hemp, and iron.

317 Pipe Lead requires great care to prevent its being bruised. Stow on a platform in sizes, coil on coil, the lesser inside the greater;

the height of the stack will depend on the weight of the pipe per foot—the heavier the pipe the higher the stack. Coils are sometimes bound with twisted straw, or packed in casks with loose straw.

318 When stowing sheet lead with general cargo, it is usual to lay the rolls from the keelson towards the bilges, the upper rolls falling between those below, and so on; it should never be laid crossways.

300 pigs of lead, weighing 22 tons, will occupy a space of 283 cubic feet or one-third of a keel. When Mediterranean wheat is 1s. 6d. quarter freight, lead should be 4s 9d. per ton of 20 cwt. E. I. Co's ton 20 cwt.

A pig of lead is about 3 feet long, and weighs $1\frac{1}{2}$ to $1\frac{1}{2}$ cwt. Spanish pigs are about 1 cwt. A fodder is $19\frac{1}{2}$ cwt or 2,184 lb.

Lead pipe of $\frac{3}{4}$ -in bore weighs 6, 7, or 8 lb per yard; 1-in 7 to 11; $1\frac{1}{2}$ -in 10 $\frac{1}{2}$, 12, and 15 lb; $1\frac{1}{2}$ -in 14, 16, 18, and 21 lb; $1\frac{1}{2}$ to 24 lb; and 2-in 17 $\frac{1}{2}$ to 24 lb per yard. Lead pipe from 4 to 5-in bore is made in lengths of 10 to 15 ft. $2\frac{1}{2}$ -in 30 to 36 lb per yard; 3-in 36 to 42 lb; $3\frac{1}{2}$ -in 45 to 50 lb; 4-in 50 to 60 lb; 5-in 70 to 80 lb. per yard.

Sheet lead $\frac{1}{8}$ -in thick weighs 5·899 lb to a square foot; $\frac{1}{4}$ -in thick 6·554 lb; $\frac{1}{2}$ -in 7·373 lb; $\frac{3}{4}$ -in 8·427 lb; $\frac{1}{2}$ -in 9·831 lb; $\frac{1}{2}$ -in 11·797 lb. Sheet lead is made up in rolls $6\frac{1}{2}$ to $7\frac{1}{2}$ feet wide, and varies in length from 30 to 35 feet. A roll 4 lb to the square foot weighs about 7 to 8 cwt; 5 lb 10 to 11 cwt; 6 lb 12 to 13 cwt; 7 lb 14 to 15 cwt; and 8 lb 16 to 17 cwt.

319 LEADS, Red and White, in powder or mixed with oil, are shipped in casks 14 lb to 10 cwt, and are useful for stowage in some general cargoes, but not on light packages.

320 LEATHER should be stowed dry and kept clear of salt water especially. Russia juffs, red, white, or black, are packed in rolls, each containing 10 hides, and from 10 to 15 of these rolls are packed together in a bundle well secured by thick matting. 20 dickers, every dicker 12 skins, make a last. 60 rolls of juffs make a last. 88 poods nett weight, shipped for Italy, make a last; and 44 poods a ton, in England.

321 LIGHTERS. Cargo should not be put into lighters unless the lighterman, or some person duly authorized, be there to receive them. The mate, or person delivering such goods overside, should take care to get a receipt from the lighterman, as this takes off the responsibility from the mate; then if any damage should occur the loss will fall upon the lighterman. Although the mate has performed his duty when the goods are over the side, yet if put into the lighter without any authorized person to receive them, the loss will fall upon the ship. Strict attention should be paid to the Overside Delivery Orders, that the goods may be delivered into the proper lighters. Lightermen have been held liable for damage to goods by negligently making lighter fast to a steamer, so that the lighter, on the tide rising, got jammed under the steamer and sunk.

322 LIMBERS or Limber Holes are square holes cut through the lower part of the floor-timbers, very near the keel, forming a channel for water, and communicating with the pump-well, throughout the whole length of the floor. Every floor-timber has two such holes cut through it, each side of the keelson. *Limber Boards* are short pieces of plank which form part of the lining of a ship's floor, close to the keelson, and immediately above the limbers. They are occasionally removed, to clear

the limbers of any filth, sand, chips, or gravel, by which they may be clogged, so as to interrupt the passage of the water to the pump-well.

323 LINENS. See Baltic and Archangel rate of freight page 22.

324 LINSEED requires 9 inches dunnage in the bottom, 14 in the bilge, and 2½ in the sides. Being more liable to shift than grain, it requires yet more caution. See grain.

At Bombay 20 cwt go to a ton; at Calcutta 62 cubic feet.

When wheat is freighted at 10s ½ qr. linseed should be 9s. Another authority says, when Mediterranean wheat is 1s ½ qr. linseed and rapeseed should be 10½d ½ qr. When Black Sea tallow is 30s ½ ton linseed should be 42103.

Best sowing Königsborg linseed is packed in barrels, whereof 24 contain 56½ scheffels. A hogshead of Baltic linseed is 7 bushels.

325 LIQUIDS should be stowed at a distance from guano, coal, rice, valonia, fruit, and other goods liable to generate heat, or leakage will inevitably ensue. Stow beer and porter on the floor; oils and molasses in the wings; and spirits and wine on the top of that part of the cargo not liable to be damaged by the breaking of the casks; and endeavor to keep all your liquids, of whatever kind, as much in one part of the ship as possible; to have good cross beds at the quarters (and not trust to hanging beds) to be well chocked with wood, and allowed to stow three heights of pipes or butts, four of puncheons, and six of hogsheads or half-puncheons. All with their bungs up. If not a full cargo stow the liquids at each end. Casks should be sounded by an authorized cooper previous to breaking out; if properly stowed the loss falls on the underwriters, but if not it falls on the ship.

326 Liquids packed in tins, such as castor oil, occasionally leak out, from the sea-water having acted on the soldering of the cases, and sometimes having corroded the tin-plate itself. A fire occurring in a ship will account for excessive leakage both from casks and tins, though it may not have touched them. See casks, oils, wastage, general cargo, &c.

The liability of all liquids to lose by ullage proceeding from the casks leaking, even where no specific injury has happened, is so notorious that it makes claims on liquids difficult to settle with underwriters. Some of the latter even maintain that they are not liable in respect of loss of liquids. This is a clear mistake; and unless they insert the warranty which exists in several East Indian policies, excepting loss on liquids, they are not exempt from claims. But as ullage or leakage is of so common occurrence, it requires very clear and definite evidence that there was violence, or some real cause of loss on the voyage, and that the loss of the liquid was not the result of faulty or unseasoned packages; neither, that it arose from imperfect quoining and stowage. It is necessary to show by the ship's protest, that at some period an undue and accidental pressure was exerted on the casks. The disturbance of the stowage of cargo by a ship being thrown on her beam ends, or by striking the ground suddenly, is sufficient to account for pressure and consequent loss. But even when a claim is established the ordinary loss by ullage, which experience has ascertained, should be deducted from it. The law does not lend much countenance to the setting up the "usage of Lloyd's" against underwriters' general liability. So in one instance, when it appeared that oil had been lost by leakage, caused by the violent labouring of the ship in a cross sea, Lord DENMAN refused to admit evidence of a usage of Lloyd's to the

effect, that unless the cargo was shifted, or the casks damaged, underwriters were not liable for any extent of leakage, however caused, as a loss by the perils of the seas. His lordship told the jury to consider for themselves whether in their opinion the damage to the oil was in fact caused by the perils of the seas. "It may be very convenient" said his lordship "for the underwriters to have such a general rule, and for the commercial world to submit to it; but if they mean thereby to control the effect of a plain instrument, they should introduce its terms into the policy". *Hopkins on Average*.

E. I. Co. allows for freight 210 imp gallons, $\frac{1}{4}$ th more for covered casks, $\frac{1}{4}$ th off measurement of casks for bulge. At New York 200 gals wine measure, reckoning the full contents of the casks, of oil, wine, brandy, or any kind of liquors.

327 LIQUORICE JUICE. A case weighs nearly $1\frac{1}{2}$ cwt.

328 LIVERPOOL DOCKS. The master porters' prices for unloading in the Liverpool docks, in 1856, were :—a Calcutta general cargo of 750 tons about £20; a China tea cargo of similar extent, £16 to £18; cotton from the United States 12s $\frac{1}{2}$ 100 bales; guano 6d $\frac{1}{2}$ ton.

329 LOGWOOD, the colored wood of an American tree. If cut in the hold, take care to remove the sawdust, which, when wet, will seriously injure other goods, sugar especially. New York ton 20 cwt.

330 LUCIFER MATCHES should be kept dry; they will spoil if stowed near bales of bacon, &c. or sand, especially salt-water sand; their vapour will be absorbed by, and injure other goods. For Australia they should be in tin cases tightly soldered down, and ought, if possible, to be stowed near a hatchway, on the top of all other goods, to prevent unnecessary pressure, and to have them easily got at in case of accidental combustion. Some underwriters decline to insure them if stowed in the hold. Use great care in moving, as they will sometimes ignite through a sudden jerk; this has occurred when merely turning over a large package, and allowing it to fall smartly, instead of easing it down.

331 MACE. E. I. Co's ton 8 cwt. Bombay, 50 cubic feet

332 MACHINERY should be placed in the vessel prior to any other part of the cargo, on account of its great weight, and to afford the opportunity of securing the several pieces properly, by beds and chocks made for the purpose. Such articles as cog-wheels and castings of a similar shape should be lashed vertically or edgewise, to the masts or stanchions, taking care subsequently to chock them on each side with rough cases of goods, well dunnaged. Where a boiler or any similar article is, *upon an extreme emergency*, carried on deck, it should be placed in beds and chocks, resting upon the beams, and as near the centre as circumstances will admit. The beams should be shored, to prevent the weight from injuring the deck. If two are shipped, they are generally secured on opposite sides, by means of lashings to the ring-bolts and by cross lashings to each other. For long voyages, vessels are selected having hatchways purposely constructed for enlarging. The East India Company usually insists on having boilers placed in the main hold. Examine the slings, hooks, and rings, and see that the chains used are by scale well able to bear the weight. See magnetism.

333 Capt. SEDGWICK says, the best way to get heavy machinery out, is to cant the main yard a little; untruss, and lash it to the main mast;

have a spare spar with a piece of plank under the heel, for a shore from the deck, lashed to the yard, about a foot inside where the foot tackle comes. Over the main hatchway a pair of shears should be rigged with planks under the heels, which should be on the beam before the main hatchway, and the beams should be well shored in the 'tween decks. According to size of shears and strength of purchase, almost any weight can be thus lifted out; and he recommends young officers, when getting heavy machinery out, to use the yard tackle over the hatchway, as well as the other in case of accident; and in lowering over the side use the tackle on the shears to lower with, as well as the yard tackle.

334 MADDER. Dunnage 9 inches with $2\frac{1}{2}$ at the sides; it must be kept dry; it attracts the atmosphere which injures it. Madder should be stowed at a distance from liquids in casks, which it causes to leak.

Bombay ton 14 cwt.

When Mediterranean wheat is freighted at $1s\ \frac{1}{2}$ quarter, ground madder in casks should be $7/10d\ \frac{1}{2}$ ton of 20 cwt. Madder roots in hydraulic compressed bales pay same freight as ground madder in casks. Loose, in bales pay one-third more than those in hydraulic compressed bales. Madder flour or garacine pays $10\ \frac{1}{2}$ cent. more than ground madder in casks.

A cask weighs 15 to 23 cwt. Smyrna bale 4 cwt.

335 MAGNESIA. A chest 1 cwt.

336 MAGNETISM OF CARGOES. Bar and railway iron, iron tanks, steam boilers, cylinders, machinery, guns, shot, iron ballast, iron ores, and other similar metallic substances, will affect, more or less, the condition of the ship's compasses, which will therefore require special attention, or serious consequences may ensue. The course generally recommended is to take the exact magnetic position of the ship's head while lying alongside the wharf, before loading, and after these disturbing substances are in, to carefully ascertain the errors of the steering compass, *in its standard position*. Make a table of these errors when the ship's head is on each separate point of *this compass*, without reference to any other compass in other parts of the ship, and act accordingly. The iron bands round trusses of pressed hay, stowed near the compasses, will cause a deviation.

Commander WALKER, R.N. who has made the subject his particular study, says in his useful work on magnetism. "If a merchant vessel have a cargo of iron, or even iron tanks, steam-boilers, or cylinders, so stowed in the hold as to be in *contact* with an iron knee or iron truss bolted to the ship's side and running upwards to the upper deck beams, such a piece of iron being in contact with large masses of metal in the hold would *conduct* or *transfer* the magnetism from below, and certainly derange the magnetic needle, and cause the compass to indicate a wrong course."

"It is on this principle of magnetic conduction that separate pieces of iron, when brought into actual contact, act magnetically as a single mass. The water tanks in a ship-of-war, if stowed in actual *contact*, will act on the compass as if a single tank of the same size as the aggregate number of small ones in the hold, occupied their places. But if the tanks be kept separate by thin slices of board, then each separate tank, &c. will retain its natural quantity of inductive magnetism, and the place of its *poles* will change with the motion of the ship."

"Being in command of a King's store-ship filled with new wrought iron tanks, and bound down channel for Plymouth, Dec. 30th, 1818, I was of opinion that these tanks would exert an additional influence on the compass. A W.N.W. compass course was shaped from St. Catherine's point for the Start. There was a fresh breeze at East, with clear weather; but at daylight instead of making the Start, it bore N.N.E. 21 miles. In this case the ship was at least 8 leagues further to the Southward than she ought to have been by steering W.N.W. I was not then aware of the fact, discovered by Professor BARLOW, that an iron tank would exert a magnetic influence equal to that of a solid of iron of the same linear dimensions."

337 **MALT**, unlike most other grain, requires to be kept perfectly free from the air. For the Colonies it is usually placed in an air-tight compartment or bin, the bulk-heads being generally lined with tin or zinc: this is not always done, as four and five guineas $\frac{1}{2}$ cent are paid to cover risk of average, which would not be the case if so packed. By small coasting vessels it is frequently conveyed in bulk without dunnage or matting, in which case the ceiling requires to be well cleansed and the bilge water kept low, or it will be blown into and injure the cargo, at sea. When cattle are conveyed in the main hold, malt is often stowed forward; dunnage is then absolutely necessary to guard against the cattle drainage.

338 **A MANIFEST** contains the name or names of the places where the goods on board have been laden, and the place or places for which they are respectively destined; name and tonnage of the vessel, master, and place to which she belongs; a particular account and description of all the packages on board, with the marks and numbers thereon, the goods contained in such packages, goods stowed loose, names of the respective shippers and consignees, as far as such particulars are known to the master, and must be verified by his signature. It should be made out, dated, and signed at the place or places where the goods or any part of them are taken on board. There is a penalty for being unprovided. For convenience there should be two copies; one is required by the Customs' authorities on arrival. Ships from abroad are also required to add a list of stores. A separate manifest is necessary for tobacco.

339 **MANURES**, patent, should be kept dry, and not near liquids or wet goods; they are usually in bags of $1\frac{1}{2}$ cwt. 20 ton go to the keel.

340 **MARBLE** See stone.

341 **MATE**. The mate or chief officer is usually held responsible for any deficiencies in the cargo at the time of discharge, and he should therefore be careful in keeping a correct account when loading. Sometimes, for the sake of dispatch, he takes an account on one side, and the supercargo on the other, and occasionally the entire duty is deputed to a youngster, while the mate is attending to some other duty. It will be no excuse for him to say so in case of deficiency when discharging, for it will not relieve him from his responsibility. If the mate's presence is imperatively required in another part of the ship, his safe course will be to suspend the reception of goods during his absence. In the service of the East India and some other large companies, all the officers are liable for deficiencies of cargo, and they make good conjointly. In other companies the chief officer is relieved from the duty altogether, and sometimes the whole responsibility falls on the supercargo.

342 Before loading, the limbers and pump-well should be well cleared. When dropping some heavy articles into the hold, the kelson is liable to injury, in which case it should be protected with a plate or slab of deal or other wood. Ballast port-bars should have becketts fitted near the ports, or some other contrivance to prevent their loss and the improper substitution of any stray pieces of wood, however unsuitable, in their places. The insufficient caulking of ballast ports has often caused injury to cargo. Side scuttles, when not required for light, can be well secured by putting a wad of oakum against the glass, and by fitting a piece of fir tight in the cell, with battens all round the outside edge of the wood; some masters parcel against the glass outside, and nail a piece of plank chamfered off at the edges. The loss of the emigrant ship *Dalhousie* is attributed to the insecurity of the scuttles. She went down off Beachy Head, in October 1853, when all, but one man (Reed), perished. The class of the ship must be considered when loading heavy goods, such as lead, &c. and screwed goods, such as cotton, hemp, wool, hides, &c.

343 All goods marked "this side up," should be so placed for their security, and to prevent after disputes. The heads of iron bolts have been known to work through five or six thicknesses of cloth, in unprotected bales, and the sharp angles of iron knees require to be avoided. The use of a naked candle in the hold should be forbidden; locked lights or safety lamps only are adapted for use there. Tobacco smoking is dangerous, and chewing leads to the injury of goods, such as marbles, silks, &c, from the expectoration which naturally follows. For the usual mode of filling up between the beams, see the article beam fillings. When packages are cut adrift for the purpose of stowage, obtain the shipper's sanction in writing, for if damage arises in consequence, the ship will be liable when the goods are landed. When goods are stowed loose or in bulk, and there is more than one parcel, take care to keep them separate, as it frequently occurs that there is a difference in the quality although it may not appear so; the ship would be liable unless the shipper gave his sanction in writing. The injury to cargo sometimes resulting from the practice of "salting" the frames of ships is referred to in the article salt. The management and dunnage of 'twixt decks and the necessity of properly securing the lower hatches, when conveying passengers, will be found under the heading general cargo. In some ships a barrel of coal tar, for the free use of the crew, is placed either in or under the forecabin, and the waste has been known to damage the cargo seriously; see tar. Sometimes in small ships, the crew in the forecabin, instead of throwing waste water over-board, let it fall into the coal bunks or the hold; these drainings frequently rot the timbers of the ship, forward, especially where the part is bulked in from the air. The topsides should be caulked after lying sometime in a tropical port; the decks should be protected from the power of the sun whenever it is strong, by awnings, and by wetting night and morning; the heat thus sent into the cargo is often erroneously attributed to have commenced among the goods themselves. The sides should also be wetted by skidding or other means. When loading some descriptions of goods in a hot climate, especially sugars in bags, they are often injured by contact with the melted pitch of the deck seams; mats or planks should be used in such cases.

344 The positions of the different articles in the hold should be noted in the cargo book, and when there is a quantity of provisions for passengers, &c. a draft of the gauges of the casks, the number of barrels, boxes, &c. with the kind of provisions they contain, will be found very useful on the voyage.

345 It is recommended that the *hatches* should be secured by being fitted as closely as is consistent with putting off and on with facility; the seams between them as well as the combings of the hatchway should be well chinned or caulked with oakum, and tarred. Well tarred parcelling, three or four inches broad, should be laid over each seam. Two good tarpaulins stretched one after the other, over the whole hatchway, should be fitted within one or two inches of the deck, where they are to be secured to the combings by battens. A third tarpaulin will sometimes be useful to keep off any chafe which may arise from various causes. It may be necessary, while opening the hatches before bulk is broken, to hold a survey in order to ascertain whether they have been properly secured, as should this not be the case, and damage through leakage have thus occurred to the cargo, it will have to be sustained by the ship, stress of weather notwithstanding. If in a dock, apply to the surveying officer, in other places to two master mariners with the master of the ship.

346 After lying a long time on one tack at sea, a vessel should bear up, sound the pumps, and if necessary clear the hold. After heavy weather the bolts which fasten the galley, &c. to the deck, should be carefully inspected, for if loosened or drawn, water will get into the hold and damage cargo to a serious extent. Some of these subjects are not exclusively controlled by the chief officer, but they are all connected with the preservation of the cargo, in which he is much interested.

Mates' Alleged Liability. Capt. P. HILMAN ship "Robert Bright," appeared at the Thames office, April 25, 1857, to the summons of Mr. J. GILBERT, chief mate, who claimed a balance of £37 5 5, due on a voyage to Rio, Cape of Good Hope, Mauritius, and back to London. Mr. PELHAM said defendant had made a charge of £11 11 3 for 5 casks beer alleged to be deficient and £7 18 11 for some posado plates, used in sugar plantations, which fell overboard accidentally when cargo was discharging at Rio. Complainant said that he could not understand the accounts of the Rio Customs' officer, who was very negligent; directly the beer was landed it was taken away. He gave as he believed, a correct account to defendant, who was in bed whilst the cargo was unloading. In consequence of a heavy swell, when heaving the bundles, the lighter rose under the sling, and the people not taking in the slack of the crane chain, the posado plates slipped out and went overboard; one was recovered by him, and the others by a diver, as he was informed. Defendant said he depended on the correctness of complainant's account. The loss of the plates was attributable to complainant's neglect in not securing the bales. It was a regulation at Rio to give to the Customs a manifest of the cargo, and if the discharge did not agree with the manifest, a fine of 100 milreis and one half the value of the goods was imposed. Mr. YARDLEY thought the loss of the bales could be recovered from the underwriters; it was a pure accident. With respect to the alleged deficiency; there was an inattentive Customs' officer, and the complainant was discharging cargo while defendant was in bed—he should have paid more attention. No negligence was proved against complainant, who must be paid the full amount claimed, with 2s. costs.

Where a master takes upon himself the responsibility of the mode of receiving cargo, that of the mate ceases. In June 1856, THOMAS STAMPER owner of the *Phoenix*, was summoned before the magistrates of Sunderland for non-payment of wages due to JOHN CROFT, who signed articles as mate of the *Phoenix*, December 6th, 1855, for a West India voyage. The question raised was, whether he was or was not liable to a deduction of £12 16s 5d value of a hogshead of sugar. W. PORRS, master, said, he warned CROFT that the loading apparatus was inefficient; a spar having been rigged in lieu of a derrick. The carpenter said the derrick he rigged was strong enough, and had lifted a hundred hogsheads, when the master ordered the alteration; the mate cautioned them that he would not be answerable if any sugar was lost. The crew altered the derrick, and the warp broke in hoisting the first hogshead, which went overboard. The bench decided that as the master ordered the alteration, the mate was not answerable.

At Whitechapel 12 Aug, 1852. *Beulah*. A chain, part of a cargo, was lost through not having a stopper. The claim against the seaman was nonsuited and the mate declared liable.

347 MATS, from Archangel are freighted 5 ¢ cent less than the freight of hemp, for any quantity not exceeding 1-6th of a ship's cargo, reckoning 400 pieces double and 500 pieces single to a ton

348 MEDITERRANEAN FREIGHTS. In the following Table of the London and Mediterranean Proportionate Rates of Freight in practice, the fair proportion is taken on the register tonnage of vessels, with due regard to their average burthen; reckoning 97 quarters of wheat to a keel of 424 cwt. with 5 ¢ cent additional for dead weight.

Usually 97 quarters of wheat weighing from 60 to 62 lb ¢ bushel are considered equal to one keel of coal weighing 21 ton 4 cwt. (424 cwt.) or to ten ton of clean hemp or flax.

It is customary that all mats, wood, sticks, rattans, &c. necessary for dunnage, stowage, or the preservation of goods, should be free of freight.

When ballast is required for a cargo of light goods, such as wools, madders, corks, &c. if the ship be ballasted with heavy goods, the freight on the same should be only one-third of the rate payable on a full cargo the like description of goods.

These rates of freight do not apply to what are termed general cargoes.

349 A master addresses the *Shipping Gazette*, 5 June, 1857. My vessel was chartered @ 35s for oil—other goods in proportion; she is full with 127 tons of locust beans, but has discharged 146 tons of oil. At what rate am I to be paid for the locust beans which are not in the table, and ought I not to have the same freight as if loaded with oil?

The Editor says, although locust beans are not in the rates, yet they are included under the heading grain, seed, &c. as paying 10 ¢ cent more freight in proportion to weight than wheat. It is however certain that locust beans were not considered when the present Mediterranean Rates were adjusted, and therefore were not intended to be included under the head of 'beans'. The fairest mode of settlement would be to pay as if the vessel were loaded with oil, but if the parties cannot agree the best plan would be to submit to arbitration.

**LONDON AND MEDITERRANEAN PROPORTIONATE RATES
OF FREIGHT IN PRACTICE.**

Tallow In casks	Wheat or Maize	Beans Peas, Tares	Seed, Linseed, Rapeseed	Rye	Barley	Oats	Flour		Oil or Wine In casks
							Barrels	Bags	
£ ton 20 cwt	£ im qr	£ im qr	£ imp qr	£ imp qr	£ imp qr	£ imp qr	£ bar	£ ton 20 cwt	£ tun 252 gal
s d	s d	s d	s d	s d	s d	s d	s d	s d	s d
6 8	1 0	1 1½	0 10½	0 11½	0 10½	0 9½	0 6	5 0	7 6
8 4	1 3	1 4½	1 1½	1 1½	1 0½	0 11½	0 7½	6 3	9 4
10 0	1 6	1 7½	1 4½	1 4½	1 3½	1 2	0 9	7 6	11 3
11 8	1 9	1 11½	1 6½	1 7½	1 5½	1 4½	0 10½	8 9	13 2
13 4	2 0	2 2½	1 9½	1 10½	1 8½	1 6½	1 0	10 0	15 0
15 0	2 3	2 5½	2 0½	2 1½	1 11	1 9	1 1½	11 3	16 10
16 8	2 6	2 9	2 3	2 3½	2 1½	1 11½	1 3	12 6	18 9
18 4	2 9	3 0½	2 5½	2 6½	2 4	2 1½	1 4½	13 9	20 7
20 0	3 0	3 3½	2 8½	2 9½	2 6½	2 3½	1 6	15 0	22 6
21 8	3 3	3 6½	2 11½	3 0	2 9½	2 6½	1 7½	16 3	23 4
23 4	3 6	3 10½	3 1½	3 2½	2 11½	2 8½	1 9	17 6	26 3
25 0	3 9	4 1½	3 4½	3 5½	3 2½	2 11	1 10½	18 9	28 1
26 8	4 0	4 4½	3 7½	3 8½	3 4½	3 1½	2 0	20 0	30 0
28 4	4 3	4 8½	3 9½	3 11½	3 7½	3 3½	2 1½	21 3	31 10
30 0	4 6	4 11½	4 0½	4 2	3 10	3 6	2 3	22 6	33 9
31 8	4 9	5 2½	4 3½	4 4½	4 0½	3 8½	2 4½	23 9	35 7
33 4	5 0	5 6	4 6	4 7½	4 3	3 10½	2 6	25 0	37 6
35 0	5 3	5 9½	4 8½	4 10½	4 5½	4 1	2 7½	26 3	39 4
36 8	5 6	6 0½	4 11½	5 1	4 8½	4 3½	2 9	27 6	41 3
38 4	5 9	6 3½	5 2½	5 3½	4 10½	4 5½	2 10½	28 9	43 2
40 0	6 0	6 7½	5 4½	5 6½	5 1½	4 7½	3 0	30 0	45 0
41 8	6 3	6 10½	5 7½	5 9½	5 3½	4 10½	3 1½	31 3	46 10
43 4	6 6	7 1½	5 10½	6 0	5 6½	5 0	3 3	32 6	48 9
45 0	6 9	7 5½	6 0½	6 3	5 9	5 3	3 4½	33 9	50 7
46 8	7 0	7 8½	6 3½	6 5½	5 11½	5 5½	3 6	35 0	52 6
48 4	7 3	7 11½	6 6½	6 8½	6 2	5 7½	3 7½	36 3	54 4
50 0	7 6	8 3	6 9	6 11½	6 4½	5 9½	3 9	37 6	56 3
51 8	7 9	8 6½	6 11½	7 2	6 7½	6 0	3 10½	38 9	58 2
53 4	8 0	8 9½	7 2½	7 4½	6 9½	6 2½	4 0	40 0	60 0
55 0	8 3	9 0½	7 5½	7 7½	7 0½	6 4½	4 1½	41 3	61 10
56 8	8 6	9 4½	7 7½	7 10½	7 2½	6 7	4 3	42 6	63 9
58 4	8 9	9 7½	7 10½	8 1½	7 5½	6 9½	4 4½	43 9	65 7
60 0	9 0	9 10½	8 1½	8 3½	7 7½	6 11½	4 6	45 0	67 6
61 8	9 3	10 2½	8 3½	8 6½	7 10½	7 2	4 7½	46 3	69 4
63 4	9 6	10 5½	8 6½	8 9½	8 0½	7 4½	4 9	47 6	71 3
65 0	9 9	10 8½	8 9½	9 0½	8 3½	7 6½	4 10½	48 9	73 2
66 8	10 0	11 0	9 0	9 3	8 6	7 9	5 0	50 0	75 0
68 4	10 3	11 3½	9 2½	9 5½	8 8½	7 11½	5 1½	51 3	76 10
70 0	10 6	11 6½	9 5½	9 8½	8 11½	8 1½	5 3	52 6	78 9
71 8	10 9	11 9½	9 8½	9 11½	9 1½	8 4	5 4½	53 9	80 7
73 4	11 0	12 1½	9 10½	10 2½	9 4½	8 6½	5 6	55 0	82 6
75 0	11 3	12 4½	10 1½	10 5	9 6½	8 8½	5 7½	56 3	84 4
76 8	11 6	12 7½	10 4½	10 7½	9 9½	8 11	5 9	57 6	86 3
78 4	11 9	12 11½	10 6½	10 10½	10 0	9 1½	5 10½	58 9	88 2
80 0	12 0	13 2	10 9½	11 1½	10 2½	9 3½	6 0	60 0	90 0
86 8	13 0	14 4	11 8	11 10	11 0½	10 0½	6 6	65 0	97 6
93 4	14 0	15 6	12 7	12 9	11 10½	10 10½	7 0	70 0	105 0
100 0	15 0	16 8	13 6	14 0	12 9	11 9	7 6	75 0	112 6

**LONDON AND MEDITERRANEAN PROPORTIONATE RATES
OF FREIGHT IN PRACTICE.**

Tallow In casks	Wheat or Maize	Madder Ground In casks	Oil Cakes In bulk	Shumac Bags.	Valonia Bulk.	Bark of Oak	Cork Wood	Bones Bulk.	Sulphur Bitumen, Rosin, Gums, Berwood
£ ton 20 cwt	£ im. qr	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt
s d	s d	s d	s d	s d	s d	s d	s d	s d	s d
6 8	1 0	7 10	4 10	5 6	6 3	9 9	30 0	8 0	4 8
8 4	1 3	9 9	6 2	6 9	7 10	11 6	35 0	10 0	5 9
10 0	1 6	11 8	7 3	8 3	9 4	14 9	40 0	12 0	6 9
11 8	1 9	13 7	8 7	9 6	10 10	16 3	45 0	14 0	7 10
13 4	2 0	15 6	9 8	11 0	12 6	19 0	50 0	16 0	8 11
15 0	2 3	17 5	11 0	12 4	14 0	21 3	55 0	18 0	10 0
16 8	2 6	19 4	12 1	13 9	15 7	23 6	60 0	20 0	11 1
18 4	2 9	21 3	13 5	15 0	17 2	26 3	65 0	22 0	12 2
20 0	3 0	23 2	14 6	16 6	18 9	28 6	70 0	24 0	13 3
21 8	3 3	25 1	15 9	17 10	20 4	31 3	75 0	26 0	14 4
23 4	3 6	27 0	16 10	19 3	22 0	33 6	80 0	28 0	15 5
25 0	3 9	28 11	18 3	20 8	23 6	36 3	85 0	30 0	16 6
26 8	4 0	30 10	19 4	22 0	25 0	38 6	90 0	32 0	17 7
28 4	4 3	32 9	20 8	23 5	26 7	41 3	95 0	34 0	18 8
30 0	4 6	34 8	21 9	24 10	28 2	42 9	100 0	36 0	19 9
31 8	4 9	36 7	22 10	26 2	29 9	46 0	105 0	38 0	20 10
33 4	5 0	38 6	24 0	27 6	31 3	48 3	110 0	40 0	21 11
35 0	5 3	40 5	25 3	28 10	32 10	51 0	115 0	42 0	23 0
36 8	5 6	42 4	26 6	30 2	34 4	53 6	120 0	44 0	24 1
38 4	5 9	44 3	27 9	31 7	36 10	55 10	125 0	46 0	25 2
40 0	6 0	46 2	29 0	33 0	37 6	58 6	130 0	48 0	26 3
41 8	6 3	48 1	30 2	34 2	39 0	61 0	135 0	50 0	27 4
43 4	6 6	50 0	31 3	35 3	40 7	63 6	140 0	52 0	28 5
45 0	6 9	51 11	32 6	36 4	42 2	65 10	145 0	54 0	29 6
46 8	7 0	53 10	33 9	37 6	43 9	68 6	150 0	56 0	30 7
48 4	7 3	55 9	35 0	39 1	45 3	70 10	155 0	58 0	31 8
50 0	7 6	57 8	36 3	41 3	46 10	73 6	160 0	60 0	32 9
51 8	7 9	59 7	37 6	43 2	48 6	75 9	165 0	62 0	33 10
53 4	8 0	61 6	38 9	45 0	50 0	78 6	170 0	64 0	35 0
55 0	8 3	63 5	39 10	46 6	51 7	80 10	175 0	66 0	36 1
56 8	8 6	65 4	41 0	48 0	53 2	83 3	180 0	68 0	37 2
58 4	8 9	67 3	42 3	49 6	54 9	86 3	185 0	70 0	38 3
60 0	9 0	69 2	43 6	51 0	56 3	88 6	190 0	72 0	39 4
61 8	9 3	71 1	44 9	52 6	57 10	91 3	195 0	74 0	40 5
63 4	9 6	73 0	45 10	54 0	59 4	93 6	200 0	76 0	41 6
65 0	9 9	74 11	47 3	55 6	60 10	96 3	205 0	78 0	42 7
66 8	10 0	76 10	48 4	57 0	62 6	98 6	210 0	80 0	43 8
68 4	10 3	78 9	49 6	58 4	64 0	101 3	215 0	82 0	44 9
70 0	10 6	80 8	50 8	59 9	65 8	104 6	220 0	84 0	45 10
71 8	10 9	82 7	52 0	61 1	67 2	106 3	225 0	86 0	46 11
73 4	11 0	84 6	53 3	62 6	68 9	108 6	230 0	88 0	48 0
75 0	11 3	86 5	54 6	63 10	70 3	110 0	235 0	90 0	49 1
76 8	11 6	88 4	55 9	65 3	71 10	113 5	240 0	92 0	50 2
78 4	11 9	90 3	57 0	66 7	73 5	116 0	245 0	94 0	51 3
80 0	12 0	92 2	58 6	68 0	75 0	118 9	250 0	96 0	52 4
86 8	13 0	100 8	65 0	74 0	81 3	128 0	270 0	104 0	57 0
93 4	14 0	108 6	72 9	80 0	87 6	138 3	290 0	112 0	61 8
100 0	15 0	116 4	80 0	86 0	93 9	148 0	310 0	120 0	66 6

**LONDON AND MEDITERRANEAN PROPORTIONATE RATES
OF FREIGHT IN PRACTICE.**

Tallow In casks	Wheat OR Maize	Hemp or Flax Clean	Wool Bales	Cotton, In loose Egyptian bales		Fruit.				Lead, Copper, Albrass, Salt, &c.
						DRY		GREEN,		
						Raisins	Currants	Oranges,	Lemons	
£ ton 20 cwt	£ im. qr.	£ ton 20 cwt	£ ton 20 cwt	£ ton 20 cwt	£ lb	£ ton of 20 cwt nett wt	£ ton of 20 cwt nett wt	£ case	£ ton	£ ton 20 cwt
s d	s d	s d	s d	s d	d f	s d	s d	s d	s d	s d
6 8	1 0	10 6	18 9	20 0	0 0 $\frac{1}{2}$	6 8	6 3	0 8	12 0	4 9
8 4	1 3	12 9	23 0	25 0	0 0 $\frac{1}{2}$	7 0	6 10	0 10 $\frac{1}{2}$	15 0	5 10
10 0	1 6	15 0	28 6	30 0	0 0 $\frac{1}{2}$	8 6	8 3	1 0	18 0	6 11
11 8	1 9	17 6	33 6	35 0	0 0 $\frac{1}{2}$	10 9	10 6	1 1 $\frac{1}{2}$	21 0	8 0
13 4	2 0	20 3	38 4	40 0	0 0 $\frac{1}{2}$	12 6	12 4	1 3 $\frac{1}{2}$	24 0	9 2
15 0	2 3	22 7	43 6	45 0	0 0 $\frac{1}{2}$	14 0	13 10	1 5 $\frac{1}{2}$	27 0	10 3
16 8	2 6	24 9	48 6	50 0	0 1 $\frac{1}{2}$	15 9	15 7	1 7	30 0	11 4
18 4	2 9	27 7	53 6	55 0	0 1 $\frac{1}{2}$	17 9	17 6	1 8 $\frac{1}{2}$	33 0	12 6
20 0	3 0	29 9	58 6	60 0	0 1 $\frac{1}{2}$	19 6	19 0	1 10 $\frac{1}{2}$	36 0	13 7
21 8	3 3	32 6	63 6	65 0	0 1 $\frac{1}{2}$	21 0	20 8	2 0 $\frac{1}{2}$	39 0	14 8
23 4	3 6	34 9	68 6	70 0	0 1 $\frac{1}{2}$	22 9	22 4	2 2	42 0	15 9
25 0	3 9	37 6	73 6	75 0	0 1 $\frac{1}{2}$	24 6	23 10	2 3 $\frac{1}{2}$	45 0	16 10
26 8	4 0	39 9	78 6	80 0	0 1 $\frac{1}{2}$	26 3	25 4	2 5 $\frac{1}{2}$	48 0	18 0
28 4	4 3	42 6	83 6	85 0	0 1 $\frac{1}{2}$	28 0	27 0	2 7 $\frac{1}{2}$	51 0	19 1
30 0	4 6	44 0	88 6	90 0	0 1 $\frac{1}{2}$	29 9	28 6	2 9	54 0	20 2
31 8	4 9	47 4	93 6	95 0	0 2 $\frac{1}{2}$	31 10	30 3	2 10 $\frac{1}{2}$	57 0	21 3
33 4	5 0	49 7	98 6	100 0	0 2 $\frac{1}{2}$	33 0	31 10	3 0 $\frac{1}{2}$	60 0	22 4
35 0	5 3	52 2	103 6	105 0	0 2 $\frac{1}{2}$	34 10	33 6	3 2 $\frac{1}{2}$	63 0	23 6
36 8	5 6	54 9	108 6	110 0	0 2 $\frac{1}{2}$	36 9	35 0	3 4	66 0	24 7
38 4	5 9	57 2	113 6	115 0	0 2 $\frac{1}{2}$	38 6	36 6	3 5 $\frac{1}{2}$	69 0	25 8
40 0	6 0	59 9	118 6	120 0	0 2 $\frac{1}{2}$	40 3	38 0	3 7 $\frac{1}{2}$	72 0	26 9
41 8	6 3	62 3	123 6	125 0	0 2 $\frac{1}{2}$	42 6	39 6	3 9 $\frac{1}{2}$	75 0	27 10
43 4	6 6	64 9	128 6	130 0	0 2 $\frac{1}{2}$	44 3	41 3	3 11 $\frac{1}{2}$	78 0	28 11
45 0	6 9	67 2	133 6	135 0	0 2 $\frac{1}{2}$	46 0	43 0	4 0 $\frac{1}{2}$	81 0	30 0
46 8	7 0	69 9	138 6	140 0	0 3	47 9	44 9	4 2 $\frac{1}{2}$	84 0	31 2
48 4	7 3	72 2	143 6	145 0	0 3 $\frac{1}{2}$	49 6	46 6	4 4 $\frac{1}{2}$	87 0	32 3
50 0	7 6	74 9	148 6	150 0	0 3 $\frac{1}{2}$	51 3	48 3	4 6	90 0	33 4
51 8	7 9	77 1	153 6	155 0	0 3 $\frac{1}{2}$	53 0	50 0	4 8 $\frac{1}{2}$	93 0	34 5
53 4	8 0	79 9	158 6	160 0	0 3 $\frac{1}{2}$	54 9	51 9	4 9 $\frac{1}{2}$	96 0	35 6
55 0	8 3	82 2	163 6	165 0	0 3 $\frac{1}{2}$	56 5	53 6	4 11	99 0	36 8
56 8	8 6	84 7	168 6	170 0	0 3 $\frac{1}{2}$	58 2	55 3	5 0 $\frac{1}{2}$	102 0	37 9
58 4	8 9	87 6	173 6	175 0	0 3 $\frac{1}{2}$	59 11	57 0	5 2 $\frac{1}{2}$	105 0	38 10
60 0	9 0	89 9	178 6	180 0	0 3 $\frac{1}{2}$	61 8	58 9	5 4	108 0	40 0
61 8	9 3	92 6	183 6	185 0	0 3 $\frac{1}{2}$	63 5	60 6	5 5 $\frac{1}{2}$	111 0	41 1
63 4	9 6	94 9	188 6	190 0	1 0 $\frac{1}{2}$	65 2	62 3	5 7 $\frac{1}{2}$	114 0	42 2
65 0	9 9	97 6	193 6	195 0	1 0 $\frac{1}{2}$	66 11	64 9	5 9	117 0	43 3
66 8	10 0	99 9	198 6	200 0	1 0 $\frac{1}{2}$	68 9	66 6	5 10 $\frac{1}{2}$	120 0	44 4
68 4	10 3	102 6	203 6	205 0	1 0 $\frac{1}{2}$	70 6	68 3	6 0 $\frac{1}{2}$	123 0	45 6
70 0	10 6	105 9	208 6	210 0	1 0 $\frac{1}{2}$	72 3	70 0	6 2 $\frac{1}{2}$	126 0	46 7
71 8	10 9	107 6	213 6	215 0	1 0 $\frac{1}{2}$	74 0	71 9	6 3 $\frac{1}{2}$	129 0	47 8
73 4	11 0	109 8	218 6	220 0	1 0 $\frac{1}{2}$	75 9	73 7	6 5 $\frac{1}{2}$	132 0	48 9
75 0	11 3	112 3	223 6	225 0	1 0 $\frac{1}{2}$	77 6	75 3	6 7 $\frac{1}{2}$	135 0	49 10
76 8	11 6	114 8	228 6	230 0	1 0 $\frac{1}{2}$	79 3	77 9	6 9	138 0	51 0
78 4	11 9	117 4	233 6	235 0	1 1 $\frac{1}{2}$	81 0	79 6	6 10 $\frac{1}{2}$	141 0	52 1
80 0	12 0	120 0	238 6	240 0	1 1 $\frac{1}{2}$	82 9	81 3	7 0 $\frac{1}{2}$	144 0	53 3
86 8	13 0	130 0	258 6	260 0	1 1 $\frac{1}{2}$	90 0	89 0	7 7	156 0	58 0
93 4	14 0	140 0	278 6	280 0	1 2	97 6	96 6	8 2	168 0	62 9
100 0	15 0	150 0	298 6	300 0	1 2 $\frac{1}{2}$	105 0	104 0	8 9	180 0	67 6

350 METALS of every description should be stowed under, and separated from, goods liable to be damaged by contact. Bundles of sheet iron, rods, pigs of copper or iron, or any rough hard substance, should not be allowed to come in contact with bales or bags, rope, canvas, or any soft packages liable to be chafed.

351 MILLSTONES. See stones.

352 MIRABOLINES or Myrabolanes. Bombay ton 20 cwt.

353 MOLASSES. No dunnage is necessary except beds and chocks to keep the bilges free; care must be taken to avoid a "falling short in the longers." The ground tier should be straight fore and aft, each side the kelson, and the heads separated by about an inch; this is done to save the length in the second and third tiers. In placing the ground tier the "breakage" caused by the masts is omitted and filled with wood, to avoid "crossing the heads" of the casks, each of which should be carefully bedded and chocked. The first tier of riders is stowed in the same manner, observing that the casks rest fairly on the ground tier, so as not to have the entire weight on any one point. The third or last tier is placed empty, bedded and chocked, and there filled by a hose. Four heights should never be taken. Shipowners have often to pay heavy damages for leakage arising from stowing too many heights without an intervening platform or 'twixt decks. Molasses weigh about 30 per cent more than rum, and it increases in weight if no loss arises from leakage, to which it is very liable. Spile holes are sometimes left open with a yarn put in to admit of fermentation, and occasionally the bungs are left out altogether. See also general cargo.

In the case of the *Elizabeth Baring v TWIZELL*, Queen's Bench, May 14, 1853, it was decided that leakage of casks of molasses, weather being such as might be reasonably expected on a voyage from West Indies; shipowner held liable. It is not enough to show that the cargo was properly stowed; the burden rests with him to prove that damage was caused by perils of the sea.

In the Bristol County Court, Jan. 1857, MR. HANCOCK brought an action against the steamer *Pioneer* for the value of two puncheons (out of five) shipped perfect in London, but delivered with their heads out at Falmouth. A notice, limiting the liability, having been previously served on the shipper, molasses well stowed, and heavy weather experienced, judgment was given for the ship with costs.

At Calcutta a ton in casks measures 60 cubic feet; in Australia 20 cwt go to a ton. At Bahia 181 old gals in pipes.

354 MOTHER O' PEARL Shells, Drops, &c. E.I.Co.'s ton 20 cwt. At Bombay shells in chests 50 cubic feet; in bags 20 cwt.

355 MUSICAL INSTRUMENTS require a very dry berth, and to be kept the right way up.

356 MUSK is obtained from a small bag under the belly of a species of deer, inhabiting the Alpine mountains of the East of Asia, and is imported from China in caddies, lined with sheet lead and paper, from 60 to 100 ozs each. An inferior sort comes from Bengal, and a still baser sort from Russia. As the odour is very penetrating, it should be kept apart from goods liable to become tainted with it. 20 cwt go to a ton; Bombay ton 50 cubic feet.

357 **MUSTARD** is packed in kegs 9 & 18 lb; firkins 36 lb; barrels 60 & 72 lb; and very rarely in casks 144 lb. Mustard will not bear the pressure of any heavy goods.

358 **NAPTHA** ought not to be stowed near tea, &c. In case of breakage or leakage, avoid taking a lighted candle near, for naphtha is not only inflammable of itself, but its vapour is highly volatile and combustible. There are two sorts, wood naphtha or pyroxylic spirit, and coal naphtha or benzole. Some masters refuse naphtha unless in iron casks.

359 **NITRE** or Nitrate of Soda, imported in large quantities from Iquique, a small port on the coast of Peru. Being very deliquescent and quickly soluble in water, it requires good dunnage, and to be stowed in a dry position, apart from brimstone, and under sugar, from which it should be well dunnaged. There is always a per centage allowed for shrinking, but if the nitre comes on board in a very green state, this per centage is scarcely sufficient.

360 **NUTMEGS**. A cask contains 200 lb. At Singapore they are packed in boxes and casks, of various sizes. 15 cwt are allowed to a ton; at Bombay 50 cubic feet in chests; E.I.Co. 15 cwt, candied 20 cwt.

361 **NUTS** require to be well dunnaged, kept dry, and not put in the same hold with bone dust or guano. A bag at Messina contains from $1\frac{1}{2}$ to $1\frac{3}{4}$ cwt; at Barcelona 1 cwt 16 lb, of which 14 go to a ton.

362 **NUX VOMICA**, the poisonous fruit of a species of *strychnos* growing in the East Indies; it is of a very bitter taste. E.I.Co. allows 15 cwt to the ton; Bombay 14 cwt.

363 **OATMEAL**. Eight sacks of Irish go to a ton. An Admiralty barrel contains 7½ bushels or 360 lb net, ¾-hhd 5½ bushels or 263 lb, kilderkin 3½ bushels or 181 lb, small cask 2½ bushels or 120 lb, and second size small cask 2 bushels or 101 lb.

364 **OATS** For dunnage see grain. A ship can take a full cargo, and if tender, ballast will be necessary. Oats do not require shifting boards; they should be closely packed, or considerable freightage will be lost; they are usually trodden down by foot, and sometimes with a stone roller or a cask full of water, an operation which wheat will not bear. Like other seeds, they are highly hydrometic, take up moisture freely, and thereby become heated in the hold. For conveyance to Australia they are often packed in hollow-ware and in the waste spaces left by loaves of refined sugar and certain other articles in boxes and casks. Dutch cheese, stowed in oats, were found in a liquid state on arrival at Port Phillip. A ship brought from Odessa a cargo composed of tallow, oats, and staves; the staves were put on the skin, tallow on the staves, and oats over all: during the voyage, the heat of the oats melted and wasted the tallow, which ran among and injured the staves, causing a very heavy loss to the ship.

88·99 quarters of oats will stow in the same bulk as 68·47 quarters of wheat, shewing a difference of $22\frac{1}{2}$ ¢ cent. For ordinary purposes it is usual to estimate 7 quarters of oats to occupy the same space as 6 quarters barley or 5 of wheat. When wheat is 1s. 6 qr freight, oats should be $9\frac{1}{8}$ for Mediterranean.

60 Riga loofs are equal to $11\frac{1}{4}$ quarters Imperial; a loof is about $1\frac{1}{2}$ bush. The Lubeck measure for oats is one-sixth larger than that for grain.

A bushel of oats weighs 35 to 43 lbs. In Ireland they are sold by the barrel of 196 lb, but this term barrel does not signify a cask.

365 OILS. Where other liquids in bottles swell and tighten the corks, oils have a contrary effect; it is therefore necessary when practicable, to see that the bottles are well corked, and even then not to rely upon their continuing tight. Oils have a tendency to expand and burst the bottles or casks when completely filled in cold weather, and subsequently placed in a warm atmosphere; this applies especially to steam-ships. All liquids have more or less the same tendency to burst, under similar circumstances. All vegetable oils promote spontaneous combustion; animal oils have not this property. Paint oils are usually shipped for export in tins.

366 Some masters recommend casks of oil to be double bedded and double quoined; from the nature of their contents they are liable to slide, and the second bed is required to meet this liability. Casks of oil should be stowed over liquids in casks in preference to dry goods, and if possible they should not be moved afterwards. Oils should not be stowed near coffee, rice, shumac, cochineal, camwood, sapanwood, guano, or any similar dry goods, which will cause the casks to leak. Oils will damage many descriptions of goods, and often cause spontaneous combustion, when brought in contact with hemp, flax, cotton, rags, black lead, &c.

367 In the Mediterranean, bottles of salad oil, in wooden boxes, commonly called dogs' houses, ought to be placed separately, for the rolling of the ship will often cause them to leak. At Gallipoli the casks are secured to each other on the beach by ropes, and towed off by the ship's boats for loading. Oils from Leghorn and Genoa, are exported in stone jars containing about 15 or 16 gal each, and are stowed on a platform on the top of the cargo, where they are lashed to the sides or bulk-heads, and, to prevent them from falling against each other, they are interlaced together with some of the grass in which they are packed. Small parcels of oil in cases, are used here and there to fill up the broken stowage. Oils from Leghorn must be kept at a distance from marble. Olive oils and other fine oils, especially when thickened by cold weather, are liable to be attacked by rats. A schooner of 111 tons register, stowed only 103 tuns of Seville oil, 252 gals to the tun. Most vessels will stow about 10 ¢ cent above their tonnage. Seville oil is packed in three sizes called pipes, casks, and quarter casks.

368 Palm oil casks require to be well white-washed with three coats, to fill worm holes &c; make the white-wash with salt water; commence stowing at the pump casing. Palm oil is very injurious to rope, canvas, and camwood.

369 Cocoa-nut Oil. Avoid taking more than a ground tier at Ceylon. It is shipped there in the bottom, with coffee in casks or bags over, and although there may be six inches of dunnage between, usually cajans, (tops of cocoa-nut trees) and rattans, deer and buffalo horns, and coir junk, which are shipped for dunnage at half freight, yet the heat of the coffee draws the oil, and much of the lower tier of coffee, especially if

in bags, is tainted by it, which is then termed "oil damaged." In iron tanks oil is not subject to this disadvantage, but is apt to become discolored. Large quantities of cocoa-nut oil are shipped at Cochin, on the Malabar Coast, with coir junk and yarn, and the cargo completed at Ceylon with coffee. The oil should be kept clear of all these articles.

370 Castor-oil is generally shipped in air-tight tin cases, covered with wood, and should not be put on the beams, for the leakage will run along and damage other goods.

371 Whale oil is shipped in casks from 40 to 275 gals. Great care is required in stowing; the largest first. No dunnage.

372 When oil is shipped with skins the oil should go at each end, although shippers sometimes desire it otherwise.

373 Charters have sometimes been erroneously accepted for tuns, 252 gallons, instead of tons of 200 gallons or otherwise.

See casks, Labrador trade, liquids, &c.

Oil damage. Among consequential damages must be placed the damage done to goods by oil, by tar, and by bilge water, no one of which ought to have had any proximity to dry goods. It may happen from want of proper stowage and dunnage; but it may also happen from sea perils, from there being so great a leak that the oil and tar which may have escaped and found their way to the bottom of the vessel, may have been up-borne by the water in the ship and deposited on the goods, which may nevertheless have been properly stowed. If an interval elapse before the goods are discharged and inspected, the only traces that remain on the goods may be those of tar or oil, and it would require the master to explain the circumstances by which the tar, the oil, or the bilge water were thrown and left on the goods, in order to relieve the ship from consequences. And I am informed the effects of concussion, stranding, and heaving down of ships by seas, are extraordinary, and such, in some cases, as would be deemed incredible were it not for contrary proofs being exhibited. Goods which were placed at the bottom of the ship have been tossed up to the top; bars of iron shifted from a longitudinal position to a transverse one, &c. A case has lately occurred in which tar damage resulted from a stroke of a sea having given the ship such a shock, that the tar cask, which was in its proper place (?) in the forecastle, was thrown forward and emptied, and the tar made its way to the cargo and injured it. Damage to goods is not confined to sea water as a cause. Damage occurring in rivers by fresh water is equally claimable. It is not likely to create so much injury as salt water, and it is not so easy of detection. Sea water damage is commonly tested by the tongue. *Hopkins on Average.*

In the case *CROFTS v MARSHALL*, where oil had been lost by leakage, caused by the violent labouring of the ship in a cross sea, Lord DENMAN refused to admit evidence of a usage at LLOYD'S to the effect that unless the cargo was shifted, or the casks damaged, underwriters were not liable for any extent of leakage, however caused, as a loss by the perils of the sea. His lordship told the jury to consider for themselves whether in their opinion the damage to the oil was in fact caused by the perils of the sea. "It may be very convenient" said his lordship "for the underwriters to have such a general rule, and for the commercial world to submit to it, but if they mean thereby to control the effect of a plain instrument, they should introduce its terms into the policy."

The gauging of casks of oil was dispensed with by the Customs in 1853; they are taken as 126 gallons to the pipe, and 63 gallons to the hogshead.

17 tuns of oil of 252 gals each, will occupy 850 cubic feet or 1 keel. When Mediterranean wheat is freighted at 1s. 4 qr. oil in casks should be 7/6 4 tun of 252 gals.

250 gals Ceylon oil in casks, measuring about 60 cubic feet, go to the ton; in tanks 50 cubic feet. E. I. Co. allows 20 cwt oil cinnamon to the ton. At New York, 200 gals, (wine measure) reckoning the full contents of the cask.

Oil, tun, wine measure	252 gals.
„ imperial measure	210 „
„ olive, chest of 60 flasks	125 „
„ jar	25 „
„ imperial gallon is	9½ lb
„ seed, tun	236 gals.
„ fish, tun	252 „
„ Spermaceti gallon	8 lb

In Candia (Mediterranean) oil is measured by the mistate 2·456 gallons; in the island of Malta by the caffiso, 4·580 imperial gallons; the Spanish arroba contains 2·78 English gallons, and is divided into quartillos or 100 panillas—the standards of the arroba are 84 libras of water and 25 libras of oil; the libra is 1·0144 lb. A Turkish almud of oil should weigh 8 okes or 22½ lb avoidupois. One English imperial gallon olive oil is about 1½ lb Hamburg weight. One tun fish oil, imperial, usually renders 58 Hamburg steckans.

374 OILCAKE in bulk should be stowed by itself; in bags or casks it may be put on dry goods. Mat between oilcake and other goods.

In the case of the *Sir T. Graham*, M'ANDREW v LIDGETT, Queen's Bench, March, 1854, it was held to be not proper stowage to fill up the spaces between casks of turpentine with oilcake, which being of a heating nature, caused the casks to shrink and leak on and injure barrels of currants below.

20 tons occupy 850 cubic feet or 1 keel; when wheat is 1s per quarter freight, oilcake should be 4/10½ per ton. The Mediterranean scale says, 4/10 per ton of 20 cwt. in bulk.

375 OIL CLOTHING should if possible, never be stowed below, for fear of spontaneous combustion, which has frequently occurred where this caution has not been observed; if stowed below, underwriters are said to be free from liability. When absolutely necessary to stow in the hold, put them on top of the cargo near a hatchway. Spontaneous combustion is most to be feared when the goods are new or not properly cured. In the year 1850, a vessel from New York for Newfoundland took fire in consequence of the spontaneous combustion of a case of oil clothing (jackets and trowsers) coated with linseed oil.

376 OLIBANUM, a gum resin the produce of a large Arabian and Indian tree, usually shipped in chests or cases; that from the Levant is generally preferred. E. I. Co's ton 18 cwt.

377 OPIUM, Bengal and Malwa, is packed in chests of 140 lbs. net each, and being very valuable in proportion to its weight or measurement, freight is usually charged at per chest. The 80 or 90,000 chests annually exported from the East Indies to the Straits of Malacca and China, used to be carried in clippers built expressly, and which took nothing else except saltpetre as ballast. In measurement about five chests would go to a ton, and each clipper took from 700 to 1600 chests; steamers

now carry nearly all. Being very carefully and securely packed, it is not liable to be affected by contiguity to other articles.

In the case of *Tronson v Dent*, where a ship from injuries received at sea, was obliged to put into Singapore, and the cargo was found partially damaged by sea water, and the master who acted *bona fide*, and to the best of his judgment, selected some damaged chests of opium, and sold them by auction, the owners of the ship were found liable to the consignees of the cargo for the loss arising out of the sale; because it appeared that the captain might have had the damaged opium dried and re-packed whilst the vessel was being repaired, and have delivered it, though in a damaged condition, at its destination, along with the other opium. And it was held that it was the duty of the master to have carried the cargo to its place of destination, although in a damaged state. This decision seems severe. *Hopkins on Average*.

Bombay ton 14 cwt. in chests; E.I.Co. the same. Two maunds of East India opium contain 149½ lbs. of Turkey 136 lbs.

378 ORES. An experienced wharfinger recommends heavy cargoes in bulk, such as the ores of copper, iron, or lead, to be conveyed in vessels having a platform built in the hold at about one-fourth of her depth from the bottom; this would make the ship lively in a sea-way. Copper ores from South America are stowed in cases or trunks shored up in the centre, and from Sydney, generally in bags which must be kept dry and not placed near the iron hoops of casks of oil or tallow. With an entire cargo a trunk-way is built up in the hold, or the ship will be considered unseaworthy.

379 New Zealand copper ore is subject to spontaneous combustion, and several serious accidents have thereby occurred. South Australian ores have not that dangerous property through the absence, it is said, of arsenic. At Adelaide, copper ore is shipped in bulk as well as in bags, at a low freight for ballast, to receive wool. See the article magnetism.

In the Court of Exchequer, Dec. 21, 1852, *Thomas Bell; Richardson v Sudler*, it was decided, that where spontaneous combustion had been caused by the ore not being calcined before shipment, the charterer was liable to the shipowner for consequent loss of freight.

In South Wales 21 cwt reckon as a ton. At New York 20 cwt. copper ore.

380 ORLOP DECK, the middle deck of a ship.

381 ORPIMENT, a mineral composed of sulphur and arsenic, produced chiefly in Turkey.

382 PADDY, rice in the husk. Bombay ton 18 cwt.

383 PAINTS are packed in tins, kegs, or casks 14 lb to 10 cwt. each. See leads.

384 PASSENGER SHIPS. The Act 18th and 19th Vic. cap. 119, regulates the conveyance of passengers to the Colonies. The following are the principal regulations regarding their accommodation and stowage.

Three conditions are necessary to constitute a chief cabin passenger, viz: that each statute adult shall have for his exclusive use 36 clear superficial feet; that he shall be messed throughout the voyage at the same table with the master or chief officer, and that the fare paid shall be at least 30s per week, for the length of voyage, as computed by the Passengers' Act.

A statute adult means a passenger of the age of 12 years, or two passengers between 1 and 12.

(12) No ship to carry passengers on more than 2 decks, except cabin passengers, where the number does not exceed 1 to every 100 tons register. No sailing ship is to carry more *persons*, including every individual on board, than in the proportion of 1 statute adult to every 2 tons register. And no ship is to carry in the poop, round house, or deck house, or on the "upper passengers' deck" more *passengers* than in the proportion of 1 statute adult to every 15 clear superficial feet, or on the "lower passenger deck," than in the proportion of 1 to every 18 feet of deck allotted to their use. But if the height between the lower and upper passenger deck be less than 7 feet, or if the apertures for light and air (exclusive of side scuttles) be less in size than in the proportion of 3 feet to every 100 superficial feet of the lower passengers' deck, then only 1 statute adult to every 25 feet can be carried on the lower deck. No ship, whatever be her tonnage or superficial space of passenger decks, is to carry more passengers in the whole than 1 to every 5 superficial feet clear for exercise, on the upper deck or poop, or on the round or deck house, if the latter be fitted on the top with a proper railing. The tonnage check is not to apply to steamers, but only the space check. The master is liable to a penalty not exceeding £5 for each person or passenger in excess.—Sec. 13 & 14.

(16) The decks on which passengers are carried are not to be less than 1½ inch thick, and to be properly secured to and supported by beams of adequate strength, forming part of the permanent structure of the vessel. The height between decks is not to be less than 6 feet. There are not to be more than two tier of berths on any deck, and the bottom of the lower tier must be at least 6 inches above the deck, and the interval between each tier of berths and between the uppermost tier and deck above it, at least 2 feet. The berths are to be securely constructed, at a distance of at least 9 inches from any water-closet, and not to be of less dimensions than after the rate of 6 feet in length by 18 inches in width for each statute adult, and sufficient in number for the proper accommodation of the passengers contained in the "Passengers' Lists." Single men of the age of fourteen and upwards, are to be berthed in a separate compartment in the fore part of the ship, or in separate rooms, if the ship be divided into compartments and fitted with enclosed berths. Not more than one passenger, unless husband and wife, or females, or children under 12, are to occupy the same berth. No berths are to be taken down for 48 hours after the arrival of the ship at her destination, unless all the passengers shall within that time, have voluntarily quitted her.—Sec. 20, 21, 22 & 23.

(17) In every "Passenger Ship" there must be a hospital or hospitals set apart, under the poop, or in the round-house or deck-house, or on the upper passenger deck and not elsewhere, not less in size than 18 clear superficial feet for every 50 passengers, and properly supplied with bed-places, beds, bedding, and utensils.—Sec. 24.

(18) There must be two privies in each Passenger Ship, with two additional privies on deck for every 100 passengers on board; and where there are 50 female passengers, with at least two water closets under the poop or on the upper deck, for the exclusive use of the women and children. The whole number of privies need not exceed 12, and they are to be placed in equal numbers on each side of the ship, and to be maintained in a serviceable and cleanly condition throughout the voyage.—Sec. 25.

(22) No gunpowder, horses, cattle, vitriol, lucifer matches, guano, green hides, or other article likely to endanger the safety of the ship or the health of the passengers, is to be taken as cargo or ballast, and no part of the cargo, water, provisions, stores, or passengers' luggage, is to be carried on the upper or passenger decks, unless so stored and secured as to satisfy the Emigration Officer, and the space deducted in calculating the tonnage check.—Sec. 29.

This Act forbids horses, asses, pigs, sheep, and oxen to be taken as cargo; and there is a general prohibition against taking as cargo, or ballast, any article or number of articles which, by reason of their nature, or quantity, or mode of stowage, shall, either singly or collectively, be deemed, by the emigration officer, likely to endanger the health or lives of the passengers, or the safety of the ship. Salted hides, packed or unpacked, salt, iron in an unusual quantity, coal, &c. are doubtful articles. Unless packed in tight casks, salted hides have been objected to. Salt properly packed and in moderate quantities, has been accepted, and so have WARLICH's, WYLLAM's, and the NATIONAL patent steam fuel, which on analysis have been found not liable to spontaneous combustion.

A less quantity of iron than two-thirds of the register tonnage has been accepted, provided the emigration officer sees that it is fairly distributed fore and aft, and raised by chequering or otherwise.

With heavy cargo in the bottom, the law permits cargo to be stowed on the passenger deck, provided that light and ventilation are not impeded, and that the room thus occupied is deducted from the space by which the number of passengers is regulated. Passenger ships must be surveyed before any cargo is taken on board. Fire annihilators are absolutely necessary.

385 The liability of owners in regard to the loss of life of passengers, &c. may be seen in the merchant shipping act, 1854, clause 504. For water and provisions to passengers and emigrants see the articles provisions and water.

386 *Emigrant Ships* should be so stowed that the consumption of water, fuel, and provisions will lighten the ship bodily, and thus keep her in trim. The lower hatches should be well secured to keep out damp and filth.

387 SEDGWICK says, all dry goods should be stowed in the after hold; rough goods not liable to be injured by water, in the other parts of the ship; iron amidships, and pitch, rosin, or tar, before the fore hatchway. One side of the main hatchway will be required for the sails (if there be no sail room) and for the new rope, as they are less liable to be injured here if a few planks are used, than they would be in the after hold, where moving casks is of daily occurrence. The remaining portion of room in the main hatchway will be wanted for the emigrants' baggage, and also all the spare room on the top of the water. With regard to provisions he advises that the beer should be stowed each side the pumpwell, the provisions abreast the after hatchway, ship's stores one side, emigrant stores the other, and the casks placed alternately, first beef then pork; the bread should be stowed right aft, blocked up to the deck; the flour and peas alternately; and the other stores as convenient, but placed together—that is, kegs of suet by themselves, kegs of butter by themselves, and so on; by adopting this plan there will be no difficulty in finding anything when wanted. The different articles of provisions required to be commenced upon immediately, should be ranged across the hold, just abaft the beam of the after hatchway; and the flour should not, as is too often the case, be kept a dozen yards from the suet, and the raisins a similar distance from something else.

388 *Troop Ships and Transports.* The Admiralty publishes "Instructions for masters on board H.M. hired transports, to be observed

when employed in carrying provisions and victualling stores from one port to another, or for distribution to ships at sea, or in victualling troops or passengers embarked." These instructions contain ample advice to owners and masters thus employed; and a copy is lent whenever a ship is chartered. Extracts from those subjects immediately connected with stowage, and not previously referred to, are inserted here or under their proper headings.

"You are on no account whatever to suffer rum or other spirituous liquors to be drawn off at any time, or moved from one cask to another, in any place except upon the upper or main deck, and then by daylight only; and at all times when lights may be required in the lazaretto, after hold, or store-rooms, you are to take care that a steady officer attends with good lanterns, strictly forbidding the candles to be taken out of them; and you are to observe that any inattention to these directions—the most rigid compliance with which is so essential to the preservation of the lives and property on board—will subject the ship's freight to a severe mulct, and the offending party will not be allowed to serve in future in any ship chartered by the Lords Commissioners of the Admiralty. The fires should also be extinguished at a fixed period, as well as the lights, except those that may be absolutely necessary."

"You are not, at any time, to allow either pigs or poultry to be kept below, and no dogs are to be embarked with the troops, or kept on board."

"You are also to cause the vessel to be frequently white-washed between decks, with wash of a proper consistency, made with unslaked lime, into which is to be put white copperas, at the rate of one pound to each bushel of lime; and it is to be laid on while hot, immediately after it shall have been well mixed."

"When Horses are embarked, the daily allowance of forage for each is to be—10 lbs Hay, 6 lbs Oats, $\frac{1}{4}$ peck Bran, and 6 gal Water. This allowance is not at any time to be exceeded. A small quantity of vinegar is to be issued daily for the purpose of wetting the mouths and nostrils of the horses."

"If, on the opening of a cask of Salt Beef or Salt Pork for expenditure, it shall be found short of the proper number of pieces by *tale*, or if correct by *tale*, but apparently deficient on the *whole* number of pieces, of the proper *weight*, you are to inform the agent thereof, when he will issue his order that all casks of salt meat remaining on board (that form part of the same supply) shall be surveyed as they become open for expenditure. The following Rule is to be observed, viz—Fourteen pieces of beef cut for 8 lb pieces, taken out of each of the casks as they rise, and the salt shaken off, are to weigh 112 lbs advoirdupois; and 28 pieces of pork, cut to 4 lb pieces, and taken out of each of the casks as they rise, and shaken off in like manner, are also to weigh 112 lbs advoirdupois."

"It is, however, to be observed that if in carrying out the above rule it shall be found that there is a surplus in weight instead of a deficiency upon the whole of the meat so weighed, you are to take care to debit yourself with such surplus on your own account."

389 *Troop Ships from India.* 10 $\frac{1}{2}$ feet (super) of deck are required for each soldier, and 17 $\frac{1}{2}$ for each invalid. It is usually calculated that a displacement of 2 $\frac{1}{2}$ to 2 $\frac{3}{4}$ tons is necessary for each man. Contractors supply provisions at from 70 to 100 rupees \pounds head, reckoning 20 weeks to the homeward passage. For sailing purposes troops are considered desirable freight.

To prevent sea sickness, Dr. LANDERER, of Athens, recommends 10 to 12 drops of chloroform in water. The chloroform, in most cases, removes nausea, and persons who have taken the remedy soon become able to stand up and get accustomed to the movement of the vessel. Should the sickness return, a fresh dose is to be taken. It was tried on 20 passengers, on a very rough voyage from Zea to Athens, and all, with the exception of two, were cured by one dose. The minority (two ladies) were able to resist the feeling of illness on taking a second dose.

390 PATENT FUEL. WARLICH's is made in blocks nine inches long, six inches broad, and six inches thick, and being thus perfectly cubical, can be stowed in much less space than coal, a ton of 20 cwt occupying only $32\frac{1}{2}$ cubic feet where the same weight of coal occupies 40 feet. It is apparent that a ship would not float if completely filled, and it is therefore customary to stow in solid blocks or tiers right up to the beams with spaces between to meet the trim of the ship. At Swansea a shoot with an india-rubber base is used; through this it is shot with so much rapidity that 1,200 tons have been put on board in 24 hours. This fuel is much less absorbent than coal, and there is consequently less danger in case of leakage, and steamers are thus enabled to carry two days' consumption on deck where it is stowed solid—the sides being formed in steps for facility of access. Some kinds of Patent Fuel are liable to spontaneous combustion, but Dr. LYON PLAYFAIR states that WARLICH's being manufactured only from small coal and tar subsequently carbonized in retorts at the heat of about 700 degrees, and all the gases which give rise to spontaneous combustion being driven out, any fears of such a contingency or of possible injury to the health of those on board, may be discarded. The Emigration Board does not object to WARLICH's, WYLAM's, or to that of the NORTH & SOUTH WALES CO. a ton of which can be stowed in 31 cubic feet.

The brig Nonpareil left London, January 27, 1856, with a cargo of Etna Fuel in bags, and when abreast of Malta, March 7, the cargo took fire and the ship was burnt. This fuel is said to be composed of resin, sawdust, and small coal; it is made in sheets of 42 squares—the sheet measuring $15\frac{1}{2}$ by $10\frac{1}{2}$ inches, and is adapted for cooking in trenches dug in the ground. The manufacturers allege that it is not liable to spontaneous combustion. The fire may have originated in the bags, the cargo having been shipped in wet weather.

391 PEPPER. Ships of 350 tons burthen will require 25 or 30 tons of ballast, stowed fore and aft, and closely planked over to prevent the pepper from working down. Some masters fill all empty casks, bags, &c, in order to make up the deficiency in the hold, caused by the shrinking of the pepper, when it becomes dry. At Singapore, pepper in single bags requires great care to prevent them from bursting. Pepper, if stowed near, will seriously injure coffee and other delicate articles. Rats will attack bales of cayenne pepper, and fatten on the pods.

E. I. Co's ton 16 cwt, long pepper 12 cwt; Bombay 14 cwt. pepper and 12 cwt. long ditto.

Black pepper in Company's bags weigh 316lb, in free trade bags 28, 56, and 112lb; a bag of white pepper contains $1\frac{1}{2}$ cwt.

392 PHOSPHORUS, a violent irritant poison, largely imported from Germany. As it inflames at a very low temperature, it is kept in bottles or jars with water; care should be observed to prevent breakages.

393 **PIANO FORTES** for Australia are sometimes covered with the best blankets, and then packed in cases lined with tin or zinc; the blankets will ordinarily sell well in the colonies. Sometimes they are packed with cotton. Piano Fortes should be stowed the right end up, in a dry berth. The cases of cottage pianos measure 45 to 50 cubic feet; CADBY's piccolos 68 feet.

394 **PILCHARDS.** As ships usually load by the head, with pilchards, the stowage should commence close aft, each side of the keelson, thus leaving the broken stowage forward; the dunnage generally used is a plank or two each side the keelson, to keep the casks clear from the waste oil and garbage which would otherwise stick to and soil them, and diminish the marketable value of the fish; but they are often shipped without dunnage, excepting some pieces of wood to keep the casks steady; it is usual to unship the limber boards to allow the waste oil to run freely to the pump-well. Ordinarily no ballast is required, and pilchards will stow up to the deck. The casks, which have very little bilge, are placed one on the other, but to meet the inequalities of the hold, wedges are fitted to keep the tiers true; as they are very slight, the crowbar should be used as little as possible. Careful stevadores always back the casks, that is they sit down and with their feet force them into their proper places. Vacant spaces can be measured with a hoop to ascertain where casks will stow, and thus save useless labour, and prevent them from being jammed into an oval shape. Merchants prefer stowing 5 hhds. pilchards only, to every ton register, *a.m.* in order to secure proper ventilation, and prevent undue pressure. Vessels from 80 to 120 tons register, are usually employed. A schooner, 111 tons register, *n.m.* shipped 704 hhds at Penzanee. Another schooner, 86 tons register, *n.m.* shipped 600 hhds, leaving space to stow 20 more.

395 The casks turned out of the cooperage have generally only ten hoops, and the merchants fit cross-bars to the heads. Masters should refuse casks which have not ten hoops, and not take any in a dirty state, for they will entail a bad character on the whole of the cargo, on delivery. The length of a hogshead is 34 inches and breadth of head 22 inches.

Nine hogsheads will weigh about two tons; in stowing, calculate 6 hhds. for every ton new measurement, and 5 for every ton old measurement. A hogshead of pilchards, well cured and pressed, will weigh about 476lb, and contains 50 gal. wine measure. The number in a hogshead is estimated at 3,000 fish. The fresh fish in a hogshead weigh about 6 cwt. and the salt about 3½ cwt; but the weight of the hogshead when cured and pressed is reduced to about 4½ cwt, including the weight usually allowed for the cask, 28lb. Ten thousand pilchards make a last.

396 **PILLARS** and Stanchions are pieces of wood or iron fitted under the beams of the decks, to support them.

397 **PIMENTO.** At New York 952 lb in casks, or 1110 lb in bags, go to a ton for freight; at Bombay 14 cwt; E.I.Co. 16 cwt; a bag weighs 112 lbs. Hamburg tares, Jamaica 2 lb per bag; Spanish 3 lb.

398 PITCH is properly the juice of the wild pine or pitch tree; and is conceived to be the oil inspissated, and turned black further than in the balsam. The best is that from Sweden and Norway. Its goodness consists in its being of a glossy black color, dry and brittle. For stowage see tar. Burgundy pitch or resin from the Norway spruce fir is imported in the form of tears or small masses, packed in casks containing from 1 to 2 cwt.

100 barrels pitch, 20 tons, admeasure 850 cubic feet or 1 keel of coal, or 97 quarters of wheat; E.I.Co. 6 barrels to a ton freight; New York same

A stand of Burgundy pitch weighs $1\frac{1}{2}$ cwt.; a last consists of 12 barrels. An allowance to be made for tare on pitch, of 50lb on Archangel casks; 86lb each on Swedish; and 56lb on American.

399 PLANTS and small trees are planted in Wardian cases, with sloping glass covers, hermetically sealed, and are usually carried on deck.

400 POISONOUS SUBSTANCES; common articles of Freight.

Acids, Muriatic	Orpiment, Sulphuret of Arsenic or Phosphorus [King's Yellow
" Nitric	Prussiate of Potash
" Oxalic	Realgar, Red Arsenic
" Sulphuric	Spanish Flies
Ammonia	Sugar of Lead, or Acetate of Lead
Arsenious Acid, or White Arsenic	Sulphate of Copper, or Blue Vitriol
Brunswick Green	Sulphate of Iron, or Green Vitriol
Chloride of Lime	Sulphate of Zinc, or White Vitriol
Corrosive Sublimate	Verdigris
Cinnabar	Vermillion
Ceruse, or dry White Lead	Vitriol, Oil of, or Sulphuric Acid
Iodine	Nitrates of Potash and Soda
Nux Vomica	

401 PORTLAND STONE; see Stone.

402 POTATOES stowed in bulk require great care, and when practicable, either the fore or after hatchways should be kept open; this applies more especially to vessels constantly in the trade, as the vapour is very injurious to their ceiling, timbers, and decks. Barrels of potatoes are sometimes perforated with holes to admit air, and in case the barrels should get wet, to let out water. For the West Indies they are usually packed in baskets containing $\frac{1}{2}$ cwt each.

17 tons potatoes will occupy 850 cubic feet or 1 keel. The Admiralty allows 13 cases preserved potato of 1 cwt. to a ton; and 22 cases $\frac{1}{2}$ cwt. to a ton.

When wheat is 1s per quarter freight, potatoes should be $5/8\frac{1}{4}$ per ton.

403 PRIMAGE is a per centage in lieu of the cargo's proportion of lights, port charges, &c. It varies in amount according to the usage of different ports; at some it is customary for the owner to receive and retain it. It is often commuted for a certain per centage on the freight. In some places it is a penny in the pound, in others sixpence for every pack or bale.

404 **PROTEST AND SURVEY.** In all cases and within 24 hours of a ship's arrival at her port of destination, (or any other to which she may have been driven for repair of damage from stress of weather, &c.) the master should go to a notary public, or in a foreign port to the British Consul, and note a protest against wind and weather, as the term is.

405 Extension of the Protest, whether necessary from damage to the ship or cargo, or other causes, must, to be valid, be effected within six months of the "noting." The "ship's log book," kept and written daily by the chief mate, and signed by himself and the master, becomes of the first importance, as the statements contained therein are the foundation of the document. It should describe most particularly the state of the wind and weather, and its effects on the ship as regards any accidents which may have arisen from its violence, the amount of damage sustained, and the cause to which it may be attributed, as far as can be ascertained at the time; also, the latitude and longitude of the ship, time of occurrence, the attention given to the pumps, &c. All interlineations and erasures should be avoided, and if any correction is necessary while writing, it should be effected by drawing the pen through the error. The extended protest being prepared, the master, chief, and one other officer, usually the carpenter, or failing these two of the crew, proceed before the notary, who reads over the document, which being found correct, is sworn to and signed by them; it is then available for the legal purposes of the concerned. The above practice differs in foreign ports, for instance—a British ship with a cargo from Peru, owned and shipped by, and consigned to Genoese, arrived in Genoa; the master was requested to protest through a Genoese notary, who accordingly received the log book for the purpose, and in addition to himself, examined two of the crew privately and separately, on the statements therein; it will thus be seen how necessary it is that the log book should be well and correctly kept.

406 There are other important matters in which a master may require to protest for the interest of his ship; as when a vessel has arrived at her port of lading, and the merchants who have covenanted, say by charter, to furnish a lading, are unwilling or unable to do so. In this case lay a reasonable time, give a notice in writing, before a witness, and note a protest against the merchants for the non-fulfilment of the "charter-party," after which he is at liberty to seek a freight in another direction, and can claim compensation for the loss of time, as well as any loss arising from his being obliged to accept a less remunerative freight than stipulated for in the original charter-party. It is improper to wait the *demurrage* days unless required to do so by the merchant. In the event of a ship performing all her engagements under the charter, and at the expiration of the demurrage days, getting no cargo, she proceeds to the port she should have discharged at, she would be entitled to her freight or the penalty usually inserted in charter-parties for the non-fulfilment; in this case the stability of the charterers should be considered.

407 *Surveys.* In surveying a Cargo, merchants or produce brokers acquainted with its nature, should be employed, and when the same is in a ship it is advisable to have at least one ship-master or other nautical person not parties to the matter, on the survey, which should be held on

the goods before being "broken out" or moved from their place of stowage. The master or some person on his behalf should be present. In the London Docks the Company's surveyor attends constantly to these duties while the ship is discharging. The nature of the damage, whether arising from improper stowage, fresh or salt water, or other causes, as nearly as can be ascertained, should be stated in the "report of survey," which should also particularize the goods, mentioning their marks and numbers, the thickness of the dunnage, and any other matters which, in the opinion of the surveyors, may be necessary; and being signed, should be given to the parties calling the survey. In discharging a cargo of Oporto wine at Plymouth, a pipe was found nearly empty, and on close inspection it was apparent that the point of a crow-bar had struck the lower part of one of the heads when stowing; the owners of the ship bore the loss.

408 While opening the hatches, some masters have them surveyed to see they were properly secured, and to guard against a charge of neglect in the event of damage to cargo; for closing hatches see mate.

409 In surveying damage done to a Ship, two shipmasters, or in their absence, any two qualified persons should be called as surveyors; it is not necessary in either of the above cases to call Lloyds' agents, but having great experience they are frequently employed. The surveyors should state in their report of survey, the particulars of the damage, as fully as possible, and in the event of the damage being repaired, the same surveyors should be called to survey and report on the repairs which have been executed.

410 PROVISIONS, Barrels of, as cargo, are allowed to stow six heights.

110 tierces beef 3 cwt. each, weighing $16\frac{1}{2}$ tons; or 156 barrels pork, 2 cwt each, $15\frac{1}{2}$ tons, will occupy a space of 850 cubic feet or 1 keel. Six tierces or eight barrels of Irish beef or pork are shipped as a ton; either quantity will weigh about 24 cwt. E.I.Co. 6 tierces to a ton; New York 6 barrels. When wheat is freighted at 1s 6 qr, beef should be $10\frac{1}{2}$ d 6 tierce, and pork $7\frac{1}{2}$ d 6 barrel.

TABLE OF THE NUMBER OF PIECES WHICH SHOULD BE IN EVERY
TIERCE, BARREL, OR FIRKIN OF PROVISIONS.

<i>Beef</i> —Navy	304 lb	6 tierce,	being 38 pieces of 8 lb each
India	336 lb	ditto	— 42 ditto — 8 lb ditto
Mess and Prime	304 lb	ditto	— 38 ditto — 8 lb ditto
Ditto	200 lb	barrel	— 26 ditto — 8 lb ditto
Ditto	100 lb	firkin	— 25 ditto — 4 lb ditto
<i>Pork</i> —India	318 lb	tierce	— 53 ditto — 6 lb ditto
Navy	320 lb	ditto	— 80 ditto — 4 lb ditto
Army	208 lb	barrel	— 52 ditto — 4 lb ditto
Mess and Prime	200 lb	ditto	— 50 ditto — 4 lb ditto
Ditto	100 lb	firkin	— 25 ditto — 4 lb ditto

For detailed particulars gross, tare, and nett naval provisions see table 3, page 20, and for the government regulations regarding casks of provisions presumed to be deficient, see *Troop Ships* under the heading Passengers.

A tierce containing 300 lb salt beef will contain only 240 lb of the canisters of preserved beef; the lesser weight is said to contain the greater nourishment.

411 **MR BRADY**, U. S. Navy, recommends that in stowing naval stores the beef should go on the port side, and the pork starboard; with flour, rice, and beans in the wings; chocking all fore and aft with wood. The casks in the spirit room are stowed in the same manner, excepting that the stowage is commenced forward instead of aft. Whiskey, molasses, and vinegar, are always stowed in casks. The liquors of the medical department and purser's stores are generally stowed in the spirit room.

412 **PUMPS**, the heels of, ought not to be placed over a seam in the planking, but if this occurs, a plate of copper should be fixed beneath to prevent the oakum from being drawn out of the seam by their suction. In 1847 the *Steboneath*, from India, was off *St Helena* where she suddenly sprung a leak, and was compelled to put in and 'heave down', when it was discovered that the seams under the pumps were devoid of oakum, evidently caused by the suction. It is desirable that the pump-well should be large enough to admit of access to the heels of the pumps, for the purpose of clearing them of dirt, &c. See tar.

413 **PUREE**. Bombay ton 8 cwt.

414 **QUARANTINE**. A list of goods and articles considered by the Customs' authorities as most liable to infection; apparel of all kinds, artificial flowers, bast (a rush) or any article made thereof, beads, bracelets, or necklaces in strings, beds and bed ticks, books, brooms of all kinds, brushes of all sorts, burdets, camlets, canvas, carmenia wood, carpets, cordage not tarred, cotton wool, cotton yarn, cotton thread, all articles wholly made of or mixed with cotton, silk, wool, thread, or yarn, down, feathers, flax, furriers' waste, goat's hair, gold or silver on thread, cotton, hair, wool, or silk, or any other substance herein-before mentioned, grooms, hats, caps, or bonnets of straw, chip, cane or any other material, hemp, hoofs, horn tips, hair of all sorts, leather, linen, lute strings, bathing, or harp strings, maps, mattresses, mats and matting, mohair yarn, nets new or old, paper, packthread, parchment, pelts, plaiting of best chip, cane, straw or horse hair, quills, rags, sails and sail cloths, silk, viz. crapes and tiffanies, husks and knubs, raw silk thrown and organizing silk, waste silk, wrought silk, skins hides and furs and parts or pieces of skins, hides, and furs, whether undressed or in part or wholly tanned, tawed, or dressed, sponges, straw or any article made or mixed with straw, stockings of all sorts, thread, tow, vellum, whisks, wool whether raw or anywise wrought, yarn of all sorts, and all other goods whatsoever if they shall have arrived in or with packages consisting wholly or in part of any of the said articles.

415 **QUERCITRON**, the bark of a species of oak tree, abundant in North Carolina, U.S; it is the *quercus tinctoria* of Linnæus, and the bark is used for dyeing olives, drabs, and yellows. It is also valuable for dressing hides, but not much used in England for that purpose. It probably contains more tannin than any other description of oak bark; of course it is necessary to prevent water from coming in contact with it, as its valuable principle is soluble in water. Hamburg tares for Philadelphia, New York, and Baltimore Quercitron is 10 ¢ cent.

416 **QUICKSILVER** is usually contained in wrought iron bottles, weighing 84 lb nett.

417 **RAGS**, particularly when unwashed, should not be stowed near oil, linseed oil especially, or turpentine, or spontaneous combustion may ensue. When subjected to heavy pressure the liability is increased.

Rags are sometimes freighted at the same rate as bark. A bag of Hamburg weighs $2\frac{1}{2}$ cwt; a bale of Mediterranean $4\frac{1}{2}$ to 5 cwt.

418 **RATS**. See vermin.

419 **RATTANS**. See dunnage. At Bombay, 16 cwt rattans in bundles, or 16 cwt ground rattans, go to a ton.

420 **RED EARTH**. At Bombay, 20 cwt go to a ton.

421 **RED WOOD**. See dunnage. Bombay ton 16 cwt.

422 **RETORTS**, (clay,) should be stowed in the hatchways or in the ends of the ship on the top of the cargo, care being taken to make a level bottom; not more than four tiers. They are in pieces 3 to 10 feet long, 14 to 20 inches diameter, and weigh 6 to 16 cwt each.

423 **RHUBARB** should be kept perfectly dry. Bombay ton 50 cub feet in cases; E.I.Co 8 cwt, and Extract Rhubarb 20 cwt.

424 **RICE** requires little or no ballast; dunnage 8 or 9 inches solid in the bilges, with strips of wood on the sides. In tierces, 9 inches in the bottom, 14 in the bilge, and $2\frac{1}{2}$ on the sides; they are stowed bilge and cutline, and carefully chocked. At Calcutta, it is frequently injured by black lead and indigo. At Singapore, Calcutta, Madras, and Bombay, rice is packed in bags double and single; the latter require great care in handling, or they will burst. Rice readily absorbs ammonia from substances containing it, and should therefore be stowed at a great distance from guano, or superphosphate. Rice will steam if it gets wet, and should never be stowed under sugar; it absorbs moisture, generates heat, and consequently creates leakage in all liquids stowed near. At Plymouth on discharging a cargo of rice, stowed on a ground tier of arrack, all the casks were deficient and some entirely empty. For the injurious effects of fermented rice in bilge water, see tea; and for additional stowage information, see general cargo.

45 cubic feet go to a ton at Calcutta; 20 cwt in bags at Bombay; E.I.Co, same; New York 20 cwt; Bahia 23 cwt in bags, 18 cwt in barrels.

A basket of shelled or peeled Moulmein is about 65 lb, mixed 60 lb, and paddy 51 lb. A bag of East India $1\frac{1}{2}$ cwt, an American cask 6 cwt. A Turkish killo is supposed to weigh 100 okes, an oke is 2·8286 lb, 40 mecmedas or kellas make one Arabian temau or tomaud, which weighs 168 lb avoirdupois. At Hamburg, the tare for Carolina is real, for East India 3 @ 4 lb per bag.

425 **ROOTS**. Sarsaparilla, ginger, and other roots require to be kept perfectly dry.

426 **ROPE** should be stowed level, and kept clear of iron and metal, and of iron-bound casks especially, as the heads are liable to destroy it by chafing. Palm oil, liquids, moist goods (sugar especially), and guano, will injure the appearance or deteriorate the value of rope.

TABLE,

Shewing how many fathoms, feet, or inches of a Rope of any size not exceeding fourteen inches, make a Hundred Weight.

in	fa	ft	in	in	fa	ft	in	in	fa	ft	in	in	fa	ft	in
1	486	0	0	4½	24	0	0	7¾	8	3	6	11	4	0	3
1¼	313	3	0	4¾	21	3	0	8	7	3	6	11¼	3	5	7
1½	216	3	0	5	19	3	0	8½	7	0	8	11½	3	4	1
1¾	159	3	0	5¼	17	4	0	8¾	6	4	3	11¾	3	3	3
2	124	3	0	5½	16	1	0	9	6	0	0	12	3	2	3
2¼	96	2	0	5¾	14	4	6	9½	5	4	0	12¼	3	2	1
2½	77	3	0	6	13	3	0	9¾	5	2	0	12½	3	2	0
2¾	65	4	0	6¼	12	2	0	9¾	5	0	6	12¾	2	7	8
3	54	0	0	6½	11	3	0	10	4	5	0	13	2	5	3
3¼	45	5	2	6¾	10	4	0	10¼	4	4	1	13¼	2	4	9
3½	39	3	0	7	9	5	6	10½	4	2	2	13½	2	4	0
3¾	34	3	9	7¼	9	1	6	10¾	4	1	8	14	2	2	1
4	30	1	6	7½	8	4	0								
4¼	26	5	3												

Use. At the top of the table marked inches, fathoms, feet, and inches, the first column is the thickness of a rope in inches and quarters; the other three the fathoms, feet, and inches, that make up a hundred weight of such a rope.

Suppose it is required how much of a 7-in rope will make a cwt? Find 7 in col. 1, under inches or thickness of rope, and against it is 9 5 6, which shews that in a 7-in rope, 9 fathoms 5 feet 6 inches will be required to make a Cwt.

427 According to Professor Robinson, if you square the circumference of rope in inches, ¼th of the product will be the number of tons weight which it will bear. Good rope of 4½ or 5 in will bear as heavy a strain as chain of ½-in; the rope will weigh about 5 lb per fathom, and the chain 14 lb per fathom; 10½-in cable will bear as heavy a strain as 1-in chain, the hemp weighing 22 lb and the chain 56 lb to the fathom. These proportions though not always accurate, are nearly so, and may serve for calculations of the intermediate sizes. At the Corporation testing machine, Liverpool, July 1857, the following results were obtained.

	Ton	Cwt
3¾-in galvanized wire rope broke at a strain of	20	15
3¾-in Manilla hemp	5	17
3¾-in Russian hemp	4	15
3¼-in galvanized wire rope	16	10
2½-in ditto	8	10

428 Coir comes mostly from Ceylon, Cochin, Bombay, &c. Coir rope in a confined position in the hold will speedily rot if water is allowed to drop on it, fresh water especially; and coir junk and yarn or fibre are liable to receive injury from oil, with which it is frequently stowed at Cochin and Ceylon. Coir rope weighs more than one-third, but not one-half so much as hemp rope. At Bombay a ton of coir in bales measures 50 feet; in bundles or loose 6 cwt; coir rope in coils 8 cwt.

429 ROSIN. E.I.Co's ton 8 barrels. A barrel contains 2 cwt.

430 RUMMAGE, to, signifies to clear a ship's hold, in order to examine its contents, or to remove goods or luggage from one place to

another. In Customs' language it means searching the ship to see that all goods liable to duty are landed, and that nothing is concealed for the purpose of evading the duty or smuggling.

431 **SAFFLOWER.** Bombay 50 cubic feet in cases and in screwed bales, and 10 cwt in bags to the ton; E.I.Co. 14 cwt.

432 **SAFFRON.** E.I.Co. 14 cwt to the ton.

433 **SAGO.** 50 cubic feet in cases go to a ton at Bombay; E.I.Co 16 cwt; Singapore 14 cwt well pressed. A bag 1 cwt; a chest 1½ cwt. The tare at Hamburg for Brazilian is 4 @ 6 lb \varnothing bag.

434 **SAL AMMONIAC.** E.I.Co. 16 cwt to the ton; Bombay 50 feet in cases, 18 cwt in bags.

435 **SALT.** Fine salt from Liverpool, Glasgow, and Droitwich, is generally dunnaged with bricks or with common salt. In ships with 'tween decks it is usual to leave open the main hatches of the lower deck to replenish the lower hold as the cargo settles; and to remove some planks each side to relieve the beams of the weight as the cargo settles; the salt in this case should be free from the sides and extremities in the 'tween decks. For cargoes requiring shifting boards see ballast. Salt, from its moisture, should be divided by bulkheads from other goods; even crates should not come in contact, for the straw will rot, and breakage ensue; it will draw liquids out of casks, and it is said, reduce the strength of spirits, tea, &c, and prevent port wine from fining. A cargo of 150 tons of common coarse salt, shipped dry at Liverpool, has made out 156 tons when discharged in damp weather at Newcastle.

436 On loading salt for the Labrador trade, a merchant says—broom and wash the hold, and dry it with mops or swabs. If the vessel is sharp-built, sound, and perfectly tight, the risk can be run of taking the salt on board without either dunnage or mats, provided the ceiling is also tight; this would be a saving, for mats are expensive, and the cargo will work out easier when there is nothing to impede the shovel. If there is any fear of leakage, as there will be plenty of room, dunnage and mats ought to be used. Keep the salt up high under the main hatch that the vessel may not be too stiff, and so labour heavily in a sea way. Should the salt be old and dry it may be better to sprinkle the top sparingly with salt water; this will crust it, and in a great measure prevent the cargo from shifting in heavy weather. When landing the salt, if the vessel is likely to be tender, and it is necessary to retain say ten or fifteen tons to keep her on her legs, trim it all out under the main hatch where it will be handy for delivery. If the hold is dunnaged it can then be broomed down and washed. Should fresh water be convenient, use it, for the hold will dry quicker and keep dry better than if salt water is used. Some merchants object to sprinkling the cargo with salt water, and to having the hold washed after discharge, either with fresh or salt water.

437 Some ships, especially North American, are, in order to preserve the timber, supplied between the skins, with rock salt, waste pickling salt from hides, &c. which is thrown into the air holes in the hold and 'tween decks, and under the covering boards, until the entire space

is filled. Forward and aft, pickle is injected by a syringe. Ships thus supplied require particular attention with dry cargoes, as a certain degree of dampness always pervades the sides and bottom in wet weather. When the salt melts it runs down until it is impeded by the 'tween deck stringers and knees, and when the ship careens it is conducted over the weather stringers into the cargo, causing serious damage to some description of goods. A partial remedy may be obtained by caulking the lower seam just over the stringers. Ships thus salted should be provided with cell pieces sloping outwards, and the skin ought to be caulked tight enough to keep the salt from the hold, when it dissolves.

The Admiralty allows 10 sacks of salt, 2,240 lb, to a ton for freight. At New York 36 bushels from Europe or 31 from the West Indies. When Mediterranean wheat is freighted at 1s 4d quarter, salt should be 4/9 of a ton of 20 cwt.

A peck of salt weighs 14lb; a bushel 56lb; a bushel of rock salt 65lb. Fine store lump salt is made up in blocks, three of which ordinarily weigh 1 cwt, but they vary considerably.

At Riga 18 barrels make a last; 2½ tons Liverpool white salt is about a last. At Memel a last is 6,000 lb. At Hamburg it is 2½ to 2¾ English tons. A Brazilian alquier is 80lb. There are 7½ River Plate fanegas to an Eng. ton.

438 **SALTPETRE**, Nitre, or Nitrate of Potash, is a species of salt found on the surface of the earth in India, South America, Southern Africa, and some parts of Europe. It is used in the composition of gunpowder, and is soluble in seven times its own weight of water at a temperature of 60° and in rather less than its own weight of boiling water. When exposed to a strong heat it melts, and by cooling, congeals into an opaque mass which has been called mineral crystal or sal prunella. Dunnage 9 to 12 inches each side the keelson, and 12 to 15 inches in the bilges well carried up. See combustion, general cargo, and sugar.

E.I.Co's ton 20 cwt; Bombay the same. Calcutta 86 cubic feet. A bag of East India weighs 1½ cwt, and a barrel of refined 1 cwt. Hamburg tare on rough East India, 7 d cent.

439 **SANDAL & SAPAN WOOD** is exported almost exclusively from the East Indies. The Co's ton 20 cwt; Bombay 16 cwt.

At Liverpool, June 16, 1853, *MULLER v STEVEN*, it was decided that the owner was liable for oil damage to sapanwood improperly used as dunnage.

440 **SEA SHELLS**, rough in bags, Bombay 20 cwt to the ton.

441 **SEALING WAX**, Bombay 50 cubic feet in cases to the ton.

442 **SEEDS** require special packing and to be kept free from damp. In bags they are usually taken at less freight with liberty to stow (like bags of rice) in the ends of the ship, the beam fillings, holes, corners, &c. For Australia they are packed in tin or zinc, soldered to keep out the air. Calcutta seeds should be avoided as freight, unless packed in pockets for broken stowage. Oil seeds from Calcutta, Bombay, and Madras, are becoming a most important article of export; they are now always in bags. Rape seed is liable to heat. Clover seed and linseed require 9 inches dunnage in bottom, 14 in bilge, 2½ in sides. See grain and linseed.

At Bombay 50 cubic feet of cummin seed go to a ton, 18 cwt linseed, and 17 cwt of other oil seeds. At Calcutta 62 cub feet of rape seed or linseed go to a ton for freight; a ton of poppyseed will measure upwards of 73 cubic feet.

A Bushel of canary seed weighs 53 lbs, of rape 48 lbs; a last 80 bushels. A sack of clover 2 to 3½ cwt, a cask 7 to 9 cwt. In some places 10¼ quarters of cole seed, and 10 qrs of corn or rape seed make a last, and in other places 21 qrs of corn go to a last.

443 SEEDLAC, Bombay ton 50 feet. E.I.Co 18 cwt.

444 SENNA LEAVES in bags and various kinds of leaves, require to be kept perfectly dry, as they are very liable to ferment and mildew; they should not be handled roughly, as they are easily bruised and broken. Senna should be stowed at a distance from all substances containing saline matter, or any other substance likely to generate moisture. It must not be placed too near aloes or drugs of a similar description, or it will become impregnated with the scent. Bombay ton senna in bags 6 cwt, in bales 50 feet.

445 SHELF or Shelve Pieces, are pieces of timber running fore and aft the whole length of the ship generally, on them the beams lodge; they are bolted through the sides, and the beams are bolted to them.

446 SHELLAC. Bombay ton 50 feet shell or stick; Calcutta 10 to 11 cwt; E.I.Co 16 cwt. A chest weighs from 1 to 3 cwt.

447 SHUMAC requires to be well trodden down. Unlike flour it is very porous and will readily imbibe dampness; water will run into it until its nature is gone and it becomes quite hard.

In most parts of the Mediterranean 18 bags go to a ton, either by weight or measurement; when wheat is freighted @ 1s 7 qr shumac in bags should be 5/6 7 ton of 20 cwt. It is ordinarily packed in bags 1¼ cwt each.

448 SILK. China raw is packed in small bales, 1 cwt each, covered with a kind of matting made of cane; Cashmere shawls in camphor wood, lined with tin and strewed with pepper and other spices. When in the same hold with teas, it is usual to select the most dry and secure place for stowing, say between the fore and main hatches; this is then called the "silk room," and is formed with boxes of tea on each side. Silk must be kept clear of the corners of hatchways and all combings, from masts, stanchions, hold pillars, &c, all of which should be well dunnaged and matted; it must never be placed near the sides, to avoid leakage from bolts, which will greatly damage it, and particular care must be observed not to stow near packages likely to chafe; neither must raw silk in bales be screwed when stowed, as by so doing the gloss of the silk is lost, and as it contracts moisture in the hold, it becomes almost as hard as a brick, if screwed. At Singapore, it is dunnaged under with rattans, and covered with several layers of mats. At Calcutta and other ports, where procurable, loose dry hides are preferred.

449 Notwithstanding the pains bestowed upon the tin plate and teak-wood cases used in packing some East Indian silks, fissures sometimes exist and admit atmospheric air, which creates iron-mould spots on the gunny wrappers, from the rusting or oxidisement of the tinned

iron. Certain corahs are thus more easily injured, from their being abundantly and improperly dressed with a fermentative alkaline paste; they quickly generates mildew on the admission of air and are not qualified for a long voyage, but if taken require special care; see fermentation.

About 8 to 8½ bales raw silk go to a ton of 50 feet. In some cases 7 bales. E.I.Co. 10 cwt Bengal raw silk or 10 cwt Chassum. At Calcutta a ton in bales weighs 10 cwt and measures 50 to 65 cubic feet; of piece goods in cases 9 cwt and 50 cubic feet. At Bombay 50 cub feet raw silk in chests, 10 cwt in bales; shawls, Cashmere, @ ½ cent *ad valorem*. At New York 8 cwt China raw.

Egyptian silks are measured by the pic 26·8 English inches. The Grecian short pica for silks is 25 inches long.

450 SILVER. Large quantities are imported in plano-convex bars, 2 ft long, 6 inches broad and thick, ½ cwt each. Boxes of Mexican specie are marked MD, dipthong fashion. When shipped in the shape of coin, as dollars, from Mexico, Peru, Chile, and various other ports, they are packed in cases, varying in size to suit the quantity contained; see gold.

451 SMALTZ OR SMALT, an oxide of cobalt, melted with silicious earth and potash, and manufactured principally in Germany and Norway. A barrel weighs 3 cwt.

452 SOAP is not liable to injury either from heat or cold; marine soap is more liable to injury from salt water than the ordinary household soap. Soap boxes being square, should if possible be all packed together; they are strong enough to carry their contents from one port to another, but will not bear a blow from the end of a cask, neither will they bear such casks or other heavy goods to be rolled over or rested on them. For Australia the boxes are usually strengthened, and for toilet soap, they are sometimes lined with tin. There is no rule regarding the sizes of chests of soap. In London they contain 4 cwt and 5 cwt each: in other manufactories the sizes are confined to 1 cwt, 2 cwt; and 3 cwt each, chiefly the larger for home consumption, and the lesser for exportation. Seven chests of 3 cwt usually go to a ton.

The sizes of boxes are—1cwt, 2ft × 16in × 1ft; 2cwt, 2ft 9in × 16in × 16in; and 3cwt, 3ft 9in × 1ft 4in × 1ft 4in.

The Admiralty allows 12 half-hogsheads of soap, 24 small casks, or 24 small casks second size and barricoes, to a ton. At Bengal, Madras, and Bombay, 50 cubic feet in chests, 20 cwt in bars, or 15 cwt in bags, go to a ton.

An Admiralty barrel of soap contains 224 lb net, half-hogshead 112 lb, and small cask 56 lb.

453 SODA, crystals of; dunnage 9 inches sides 2½. Soda, Soda Ash, or Alkali, is very absorbent of moisture, and is therefore subject to increase of weight, or by access of water to being dissolved and destroyed; having a powerful action on most animal and vegetable substances, it should be stowed clear of such articles. Natron, obtainable from the East Indies and from Egypt, is a native form of Soda.

16 tons in casks, or 21 tons in bulk, occupy 850 cubic feet or 1 keel. When wheat is 1s ½ qr freight Soda and other Alkalies should be 6/10½ ½ ton in casks, and 4/7½ ½ ton in bulk. Soda is packed in casks 2 to 6 cwt.

454 **SORGHO** or *Sorghum Saccharatum*, or *Sorgho à Sucré*, a grain-bearing plant a native of China, cultivated in the South of France; it grows 9 feet high and produces 4 to 6 stalks, each having a bunch containing 2,000 to 3,000 seeds; from the stalk is obtained sugar and alcohol; the green leaf is eaten by cattle. Indian millet is a variety of Sorgho imported from Turkey and other places, often under the Turkish name of *dari*, (a corruption of the Arabic *dhurra*), and is well known in the West Indies as Guinea corn, and at the Cape as *Caffre corn*; this variety is also cultivated in China, and latterly in Australia.

455 **SPIKENARD**. E.I.Co's ton 10 cwt.

456 **SPIRITS**. Stow at a distance from salt, which will reduce the strength, and from guano, grain, flour, oilcake, or any other heat-producing goods, which will cause the casks to leak. See ammunition, casks, general cargo, liquids, and passengers: the last of which, under the sub-heading of Troop Ships, includes the government regulations for drawing off spirits. Brandies and other spirits for the Australian Colonies are generally in hogsheads and quarter casks, or packed in straw in cases containing one dozen each. Gin from Holland is occasionally sent there in square glass bottles, packed with husks in cases so weak that the husks run out and the bottles are very liable to break; great care must therefore be observed. When a cask or case bursts or leakage occurs, no lighted candle should be brought near, for the vapour which rises is highly combustible. The passenger Act, 1855, inflicts a penalty of £20 for selling spirits to passengers.

457 Many lives have been sacrificed through accidental fire in the lazarette, when spirits are being drawn for ship's use by candle light. It is suggested as preferable to have a small place, even a sleeping berth in the cabin, appropriated specially for the purpose; see gunpowder.

458 **Brandy**. A schooner which now registers 82 tons and formerly 90 tons, with depth of hold over 10 feet, beam 19 feet and a fraction, length from bulkhead to bulkhead 43 ft 6 in, stowed a cargo of *Charente brandy*, consisting of 123 hhds, (60 gals,) 139 quarter casks, (30 gals,) and 1600 square cases, each containing one dozen quart bottles.

At Bristol, July 1857. *MILES* sued *GARRARD* for £27 10s, value of a hogshead of brandy, being one of 25 shipped on board the *Morning Star*, which had leaked away on the passage to Melbourne, where the surveyors stated that "the head was defective; instead of the staves being strait across so as to form a close and compact head, they were a little awry, and one was too short to fit in the groove of the vent stave." Mr *GARRARD* said the cask was new from Charente, and had been three months in bond; his delivery note said, "free of all charges on board the *Morning Star*." The bill of lading said "Shipped in good order" and "not accountable for leakage." Plaintiff non-suited.

459 **Rum** can only be imported in ships of at least 50 tons burthen, and in casks of not less than 20 gallons, or bottles not exceeding 3 pints. At Calcutta the lower tier, puncheons in the broad spaces, hogsheads in the narrow; cover the quarters of the casks with teak slabs not less than an inch thick, and bring it thus right up to the beams. From the East Indies it is often injured by being stowed under native sugars the weight of which crushes the casks; importers prefer to have the rum stowed forward or aft, and the sugars amidships.

At Calcutta a ton of rum in casks for freight, measures 60 cubic feet. At Bengal 2 puns or 4 hhd. At Madras and Bahia 210 old gallons in pipes.

Admiralty casks of rum : punch. 79 gallons, hhd 54, barrel 36, $\frac{1}{4}$ -hhd 25, kilderkin 18, and small cask 12 gallons.

A puncheon of Jamaica rum contains 84 to 90 gal ; hhd 45 to 50 gal.

460 *Wine*. For stowage see protest and spirits; for bottles see glass. Cockroaches have a great predilection for champagne and other light wines, and unless the corks are covered with tinfoil or metallic capsules, they will eat through and waste the contents of the bottles.

A master writes to the *Shipping Gazette*, July 29, 1857, My vessel arrives with wine, freight payable at per tun of 252 gals. The officers of Customs furnish particulars of quantity on which the Crown receives duty, and on that quantity the merchant proposes to pay freight. Is he not liable to pay on the entire quantity in each cask, the ullage of which is usually a gallon or more? The editor answers,—there is no Customs' allowance on wine; the duty is paid on the quantity actually delivered and so should the freight. It happens frequently that the shipping and landing guages do not agree. It once occurred that where 1,636 gals Marsala were invoiced, the guage made it 1,567 gals, on which of course the duty and the freight were paid.

The Admiralty allows 18 cases wine, one dozen each to a ton. Cases of three dozen measure about 4ft 6in. When Mediterranean wheat is freighted at 1s $\frac{1}{4}$ quarter, wine in casks should be 7/6 $\frac{1}{4}$ ton of 252 gallons.

Capacity of Wine Casks. 1 hhd of claret 46 gallons; 1 aum hock Rheins and Moselle 30 gal; 1 hhd tent 52 gal. *Pipes*; Marsalas bronte 93 gallons; Sherry 108 gal; Port 113 @ 116; Madeira 92; Teneriffe 100; Lisbon 117; Malaga 105; and Cape 92. A tun of wine 252 gal; a double butt of wine contains 2 pipes, and is ordinarily cased. See casks.

Admiralty white wine casks measure—hhd 54 gal; barrel 36; $\frac{1}{4}$ -hhd 25; kilderkin 18; and small cask 10 gal. See table 3.

French Wines are usually sold in bottles. *German* are sold by the aum, containing 30 gal; a fuder (4 oxhoft) 240 stübchen or 196.8 gal. *Spanish* are measured 4 copas 1 quartillo 0.1105 gal.; 4 quartillos, 1 azumbre, 0.4422 gal; 8 azumbres 1 arroba or cantaro 3.5380 gal. The *Malta* barile is 9.160 gal imp.

17 tuns of wine, brandy, or any other spirit, reckoning the full guages of the casks—4284 gal, weigh 20 ton, and occupy a space of 850 cubic feet or 1 keel.

The freight of bottled spirit or wine in cases is the same as for bottled ale and beer, which see.

In measuring for freight it is the practice of the E.I.Co. to take liquid casks, 210 imperial gallons; $\frac{1}{4}$ more for covered casks, $\frac{1}{4}$ off measurement for bulge. At Bombay wines and spirits, in casks or cases 50 feet. At New York 200 gal wine measure, reckoning the full contents of the casks of wine, brandy, or other kind of liquors, go to a ton.

A puncheon Scotch whiskey contains 112 to 120 gal; punch brandy 100 to 110 gal; hhd brandy 45 to 60; $\frac{1}{4}$ -cask 20 to 25; piece Geneva about 116 gal.

Wine & Spirit Measure. 4 gills 1 pint, 2 pints 1 quart, 4 quarts 1 gallon, 63 gal 1 hogshead, 84 gal 1 puncheon, 2 hhd or 126 gal 1 pipe or butt, 4 hhd or 252 gal, 1 tun.

At *Naples* spirits and wines are measured by the barile of 60 caraffi or 9.174 gal, the botte of 12 barile 110.088 gal, and the carro of 2 botti 220.176 gal. A *Tuscan* barile of spirits weighs 120 libbre; a libbre is 0.7486 lb.

461 SQUINANthem. 16 cwt go to a ton at Bombay.

462 STARCH should be stowed at a distance from all deliquescent salts such as soda, potash, saltpetre, &c. and from all ammoniacal matters; see rice. All liquids placed near will be liable to leak.

463 STATIONERY, in small bundles, should be conveyed by hand and not suspended by the cord; bales are injured by being dropped suddenly on the ends or corners. Stationery must be kept dry, and apart from ballast, and from liquids especially oil, turpentine, &c. the scent of which alone, diminishes the value of paper. One experienced London firm uses for America, cases made of $\frac{3}{4}$ -inch hooped stuff with inch ends; for India the same lined with tin, and for Australia with zinc; for the Overland route cases of $\frac{1}{2}$ -in stuff, lined with tarred paper or gutta percha, as the whole must not weigh over 80lb. The middle or upper part of the hold or the 'tween deck, is preferred for stowage.

Paper & books. 24 sheets 1 quire; 20 quires 1 ream; 2 reams 1 bundle; 4 pages 1 sheet folio; 8 pages 1 sheet quarto; 16 pages 1 sheet octavo; 24 pages 1 sheet duodecimo; 36 pages 1 sheet eighteens.

TABLE OF SIZES OF WRITING SLATES.

PORTMADOC						LIVERPOOL									
Sizes Inches	In box dos	Length ft in	Breadth ft in	Depth ft in		Sizes Inches	In box dos	L	B	D	Cube				
6×4	30	3 5	1 5½	1 2		6×4	24	2 8	1 5	1 1	4 1				
7 5	24	2 10	1 7	1 3		7 5	20	2 3	1 8	1 3	4 8				
8 6	20	2 4½	1 9½	1 5½		8 6	20	2 3	1 10	1 5	5 10				
9 6	20	2 4½	1 11	1 5½		10 7	16	3 10	1 8	1 2	7 5				
10 7	18	4 2	1 8	1 1½		11 7	15	3 6	1 9	1 3	7 8				
11 7	15	3 7	1 8	1 2½		12 8	12	3 0	1 10	1 4	7 4				
12 8	12	2 10	1 10½	1 3½		13 9	12	3 0	2 1	1 6	9 5				
13 9	10	2 4½	2 1	1 5		14 10	10	2 6	2 3	1 6	8 5				
14 10		3 10	1 6	1 2											

AVERAGING 7 OR 8 TO A TON.

AVERAGE WEIGHT 2½ CWT.

UNFRAMED SLATES.

Sizes Inches	In box dos	Length ft in	Breadth ft in	Depth ft in
6×4	60	2 6	1 3	0 10½
7 5	48	2 4½	1 5	1 0½
8 6	40	2 1	1 7	1 3
9 6½	40	2 1	1 9	1 3
10 7	20	2 1½	1 4½	1 0

AVERAGE WEIGHT 3 CWT. EACH.

464 STAVES. Vessels of 500 tons may require 40 tons of ballast stowed fore and aft, on which a level surface is made with the staves over the floor; the layers are formed by placing the staves edgewise in the direction of the keelson, fore and aft, after which they are wedged in tight with a *lignum vitæ* mall, and so continue until the vessel is full. The green and undried staves being heavier should be put below. Staves are mostly freighted as broken stowage at a reduced rate, but as they are usually placed where few other goods would go, they are not unprofitable to the ship although the freight is comparatively low; they are often injured by being stowed under tallow, which melts during the voyage.

465 The Admiralty gives the following instructions to the masters of transports when returning staves. "When it is found necessary to shake the casks while on board, and you are consequently obliged to return them into store as staves, you must particularly observe that their several denominations are specified in the receipt you obtain for them, in order that you may thereby be enabled to ascertain their relative value in tonnage, cast agreeably to the following scale, in doing which you are to carry the remains of one denomination to the next in succession, and if the remains of the last denomination be under twelve, no allowance can be claimed for them, but if twelve or above, then one-half hogshead is to be allowed, viz :—

22 Leager staves=1 leager	17 Barrel staves=1 barrel
20 Pipe 1 pipe	17 Irish barrel... 1 Irish barrel
20 Butt 1 butt	17 Half-hogshead 1 $\frac{1}{2}$ -hogshead
20 Puncheon ... 1 punch.	17 Small cask ... 1 small cask
19 Hogshead ... 1 hhd.	2 Single headings 1 barrel stave

For the Admiralty tonnage of staves, packs, hoops, &c, see page 18.

The following quantities of staves severally weigh $15\frac{1}{2}$ tons and occupy a space of 850 cubic feet or 1 keel—

1-275	Mille	Baltic reduced, viz 1,200 pieces, 66in long by $1\frac{1}{2}$ thick
1-300	Ditto,	Odessa ditto
1-200	Ditto,	Quebec ditto
0-840	Ditto,	Baltic Staves rough, 1,200 pieces, 27 inches by $3\frac{1}{2}$
0-708	Ditto,	Odessa ditto 1,200 pieces, 76 " $3\frac{1}{2}$
1-054	Ditto,	Quebec ditto 1,200 pieces, 66 " $2\frac{1}{2}$
3-885	Ditto,	West India 1,200 pieces, 42 " $1\frac{1}{2}$

The Staves to average 6 inches in breadth.

One hundred staves contain 120 pieces; and 1 mille is 10 hundred, or 1200 pieces.

Baltic staves as cargo; 1 mille running pipe equal to 20 loads of fir timber.

1 mille standard (1200 pieces) equal in measurement to $16\frac{1}{2}$ loads timber

1 " W.India (1200 pieces) " " $5\frac{1}{2}$ "

Dantzic pipe staves are of three different sorts, crown, brack, & bracks brack.

The usual size of crown pipe staves, not exceeding 72 inches in length, 7 in width, and 3 in thickness.

Brandy staves at least 54 to 58 in. long, as thick and broad as pipe staves.

Hogshead 42 to 45 in. long, breadth and thickness as pipe staves; all English measure.

The quality is ascertained by marks to distinguish each sort.

Crown pipe staves stamped at the end K.	Brack in middle I.	Bracks brack I.I.
Hogshead Crown at the end O.K.	Brack in middle I.	Bracks brack I.I.
Brandy hhd. crown at the end B.K.	Brack in middle X.	Bracks brack X.X.

When pipe staves are taken for broken stowage at Dantzic, freight is paid $\frac{1}{2}$ mille (that is 1,200.)

Christiana staves for hogsheads occupy much space, therefore more than ten ought not to be counted to a deal.

Stettin; 1 mille pipe staves, 1200, is equal to 1800 hhd, 2400 barrels, 3600 hhd headings, or 4800 barrel headings.

Quebec pipe staves are from 64 to 68 in long, 5 to $6\frac{1}{2}$ broad, and $1\frac{1}{2}$ to 3 thick. 1-in pipe staves are $\frac{3}{4}$ d less than the standard; and every $\frac{1}{4}$ -in above $1\frac{1}{2}$ -in is charged $\frac{1}{4}$ th more without allowance for breadth.

$1\frac{1}{2}$ inch pipe staves	66 inches long are the Standard pipe staves
$1\frac{1}{4}$ „ hhd staves	54 „ $\frac{3}{4}$ ds of ditto
$1\frac{1}{2}$ „ barrel staves	42 „ $\frac{1}{2}$ of ditto
$1\frac{1}{2}$ „ heading staves	30 „ $\frac{2}{3}$ ths of ditto

1 mille or 1,200 standard *Quebec* staves are equal to 343 ft 9 in or $6\frac{1}{2}$ loads,
 175 ditto are equal to 50 ft 1 in and $6\frac{1}{2}$ parts,
 or 1 load 1 in $6\frac{1}{2}$ parts.

Under the article Timber will be found several comparative results applicable to staves.

466 **STEEL.** Bar steel is sent from Sheffield in bundles of about 1 cwt. each, and may be stowed as bar iron. Tilted cast steel and shear steel for exportation, are packed in extra strong cases of about 5 cwt each, iron bound. The air arising from salt water will always create a certain amount of rust on steel, iron, &c, and no master should be considered liable for injury by rust, unless it can be clearly proved to have arisen through negligence on his part. A faggot of steel weighs 120lb. For Australia cutlery is packed in air-tight casks, lined with tin.

467 **STEVADORES.** It is the practice with some masters to rest entirely on the integrity of the stevadore for the stowage of cargo, but this confidence may be misplaced. At times the interest of the stevadore is directly opposed to that of the shipowner. When the stowage is paid for by a round sum, endeavors are made to fill as fast as possible by what is technically termed 'blowing the ship up'; on re-stowage it has been found that the hold was capable of taking many additional tons of goods. The reverse of this also occurs. Cargoes of iron have shifted after stowage by stevadores; and many iron-laden ships founder. After two or three voyages to the Brazils, some seamen and apprentices can stow hides &c. better than the most orthodox stevadores. As facts of this kind can be readily multiplied, masters and mates will do well in some cases, to judge for themselves, and, remembering the liability to the underwriters, see to the stowage of their ships, even where stevadores are regularly employed. Some masters send an officer, the second mate usually, into the hold while the stevadores are there; he can see that proper dunnage is used, prevent pillage of cargo, and knowing where the various goods are stowed, save much trouble and confusion when discharging.

At Liverpool, Jan 8th, 1857, JOSEPH GORMAN, stevadore, sued P. TAYLOR, owner of *Summer Cloud*, for 1s 6d ton for stowage, he having been discharged for delay, after commencing the work. GORMAN proved that the delay was caused through want of dunnage, and the jury awarded him £6 damages.

468 **STONE CARGOES**, being heavy, should be kept well up from the ship's floor, by which she can be laden and discharged readily, and will obtain a better equilibrium at sea.

469 There are two difficulties connected with the freightage of stone, which require special attention. The first has reference to its weight or specific gravity, which is estimated by comparison with water, a cubic foot of which weighs 1000 ounces, and the same quantity of Bath stone 2·510 oz. more than double; granite yet heavier, 2662, &c. It is not possible to

state correctly how many cubic feet of different descriptions of stone will weigh 20 cwt, but it is necessary when chartering, that masters should be able to make some calculation. The following table, which is only approximate, may assist them. The second column shows the average specific gravity in ounces, of each description of stone; this of course is the only criterion of its weight, but it must not be forgotten that there is a variation in the weight of the same kind of stone from different quarries, and that stone from the same quarry will differ in weight according to the time which has elapsed since its removal, and according to the amount of its subsequent exposure to the atmosphere, Bath and Portland especially. Where there are no instructions under 'tonnage for freight' reference can be made to other stone of about the same specific gravity, and an estimate formed accordingly. The discrepancy between col 4, which gives the number of feet to a cubic ton of 20 cwt, and col 5, which gives the customary measurement for tonnage for freight which is in some cases less, although in practice it is much more, is explained in the next page.

1 Description	2 Specific Gravity	3 Cubic Foot.	4 Cub. feet to a ton of 20 Cwt.	5 Tonnage for Freight.
Bath Stone	oz 2·510	lbs. 157	14½	17 cubic feet to the ton freight
Caen				17 ditto
Craigleith	2·362	147·6	15	
Dundee	2·621	163·8	13¾	
Granite, Dartmoor	2·662	166·4	13½	Dartmoor Granite 14 to 20 feet.*
— Aberdeen	2·625	164	13¾	
— Penryn..				15 cubic feet
— Penzance				14 cubic feet
Guernsey blocks ..	2·710	168	13½	Measurement ton about 30 cwt.
Limestone, Plymo.	2·720	170	13½	12 or 13 cubic feet
Marble, white	2·706	169	13½	13 ditto
— Carara ..	2·716	170	13½	
Paving Stone	2·416	151	15	14½ ditto
Porphyry (red) ..	2·871	179	12½	
Purbeck	2·601	162·6	13¾	
Portland Stone ..	2·113	132	17	16 feet ½ ton of say 22 cwt.
Slate, Welsh	2·752	172	13	
— Roofing ..	2·672			
— Drawing ..	2·110			
Yorkshire Landings	2·450	155	14½	Flags ½ ft super, by thickness.†

* Granite is sometimes sold 20 cwt to the ton, and so freighted.

† 15 cubic feet of Yorkshire Landing usually go to a ton.

470 The second difficulty regarding the freightage of stone and one of far greater importance, arises from the mode of estimating the freight of some kinds. Where a ship will carry 100 tons of coal which measures 40 cubic feet to the ton, it is but natural to suppose that she would carry 100 tons of stone in block, which in no case measures 20 feet to the ton, but, through the mode of measurement, such is not always the case.

471 When stone for building is required to be very fine dressed, or dressed with very fine edges, contractors usually purchase it from the merchants in the form of rough scappled blocks, and dress it to the required shape and fineness, on the ground adjoining the work, to prevent the injury which fine dressed and sharp-edged stone would be almost certain to sustain in its carriage by vessel, from the merchant's yard to the place where it is to be used.

472 In such cases the merchant always allows at *least* two inches on its length, two on its breadth, and two on its thickness more than the stone is required to be when finished. Frequently 3, 4, and even 5 inches are left on one of its dimensions, and hence arises the anomaly of what is termed "long tonnage" for stone freight: An example may make this more clear.

A Contractor requires a Stone which when finished will measure	} ft 3 4 × 3 4 × 1 4 = 14 10, say 1 ton
He orders the Merchant to send him a scappled stone block to clear the above size. To do this the Stone must be at least	} 3 6 3 6 1 6 = 18 5, say 1½ ton
The men employed by the Merchant to cleave the Stone, find beds in it which will allow them to cleave it more easily	} 3 9 3 9 1 7 = 22 3, say 1½ ton

The Stone is sent away this size for shipment, but being invoiced to the Contractor at 14 ft 10 in or 1 ton, the master will receive a freight for 1 ton only, and not for 1½ tons, which the Stone actually weighs, unless the master makes a previous arrangement to meet the over weight.

A sloop carrying 53 tons weight of rubble Limestone was down to her load-line on five occasions, with 34, 36, 38, 41, and 42 measurement tons of rough granite. A sloop carrying 60 tons limestone, took on one occasion, only 40, and on authority, 36 measurement tons rough granite. Cornish granite dressed or worked, has been found to weigh 20 cwt to 12 cubic feet exactly. Granite dressed for a dock at Copenhagen, and shipped by measurement at Looe, weighed 7 per cent against the ship, say 107 instead of 100 tons. Not dressed 112½ to 100 tons.

473 *Granite* is ordinarily put on board by crane gear provided by the merchant, with good strong sling chains, and strong hooks, if the vessel is of sufficient hatchway to let the blocks down clear; if the blocks are very large, the best mode is with lewis. Good wood dunnage should always be provided, so that the corners of heavy blocks may not bear on one timber, but give a share of the weight to several. Great care should be taken to have the cargo well chocked to prevent its shifting, as vessels are often placed in danger for want of attention to this important point. In China, granite dressed for window cills, door steps, &c, is shipped for ballasting cassia and other light freight, when bound to Singapore, &c.

474 *Grindstones* are generally stowed on their edges; potsherds, when procurable, make a good bed; the great object is to prevent damage to the edges; sometimes they are stowed flat, one on the other, with sand between to prevent chipping. The shipper sends a man into the hold who is paid by the master. 26 chaldrons grindstones, mixed sorts, weigh 21 tons and are equal in bulk to half a keel of coal or 425 cubic feet. Grindstones vary in size from 10 to 56 inches diameter, by about 2 to 8 in. in thickness. They are classed in eight different sizes, called *foots*, according to their dimensions, as in the following table.

Denomina- tions	Diameter	Thickness	No in a Chaldron	Denomi- nations	Diameter	Thickness	No. in a Chaldron
foot	in	in		foot	in	in	
1	10	2	36	5	35	5	5
2	14	2½	27	6	42	6	3
3	20	4	18	7	50	6	1½
4	28	4	9	8	56	8	1

A grindstone *foot* is 8 inches; the size is formed by adding the diameter and thickness together. Thus, a stone 56 in diameter by 8 in thick, making together 64 in, is an 8-foot stone of 8 inches each foot.

NEWCASTLE TABLE OF GRINDSTONES.

Shewing the various sizes from 1 to 8 foot, the weight of each Stone, and each Chaldron.

Denomi- nation	Diamtr	Thknes	No to a Chldrn	Weight of one Grindstone	Weight of one Chaldron
foot	in	in		cwt. lb	cwt lb
1	10	2	36	0 12½	4 10
1½	12	2½	30	0 22½	6 15
2	16	3	27	0 48½	11 79
2½	18	3½	21	0 67	12 67
3	21	3½	18	0 98	15 88
3½	24	3½	12	1 19½	14 6
4	28	4	9	1 76½	15 107
4½	32	4½	6	2 68½	15 75
5	36	5	5	3 78½	18 44
5½	39	5½	4	4 84	19 0
6	42	6	3	6 11½	18 5
7	49	7	1½	9 61½	14 36
8	56	8	1	14 28	14 28

475 *Marble* in blocks should be stowed on the flat of the floor, in the middle of the ship, taking care to have good dunnage to prevent other portions of the cargo from damaging it. No goods of a greasy nature or likely to leak, should be stowed over or on it; two drops of oil on a slab of fine marble will spoil it; great attention is required to this fact, especially when loading at Leghorn and Genoa, where marbles and oils are frequently stowed in the same hold. Sugar is equally injurious. Water, especially salt water, will stain marble, and the expectation of those who use tobacco will greatly injure it; in fact the use of tobacco should be prohibited while receiving or discharging marble. At Leghorn wrought marbles and statuary are measured by

the palmas, and the rough parts (like granite) make the tonnage for freight very heavy, but as the cargo there usually consists of light goods, the shipment of a few additional tons of marble may be convenient for trimming. All packages and cases of wrought marbles should be stowed with the right side up, or breakage may take place. English marbles are more brittle than those of Carara or Bardilla.

476 *Millstones* vary in size from 55 to 72 inches diameter, by 9 to 12 inches thick, and are stowed the same as grindstones, which see.

477 *Portland Stone* is often taken on board by means of derrick and gear, which can be obtained at the island. The men there load the vessel, and she has to pay out of her freight 1/6 p ton for this service.

478 *Slate* is as brittle as earthenware and requires equal care; it should never be shipped in wet weather; it ought to be stowed on its edges and kept in that position; when flat it will be almost sure to break. Slate must be stowed athwart and not fore and aft, otherwise when the ship pitches, great destruction must ensue, besides which, if stowed fore and aft, and the slate settles wedge fashion, the ships' sides must strain.

479 With general cargo, slate should be stowed on as level a surface as possible, which with coal or ballast can be easily arranged. The ground tier with edges down, and fore and aft, right athwart the hold, the longers carried fore or aft to the extent required for containing the quantity to be shipped, care being taken to keep the edges level. The next riding tier should be on their flat and so on alternately; the flat tiers should be as shallow as is consistent with the strength required to resist the weight of the overlying tiers, without breaking; the object for stowing a flat tier alternately is to prevent the upper from wedging themselves down by the working of the ship, among the lower tiers, by which they would be broken. They will not bear heavy cargo on them. Stowed carefully this way, straw, which is frequently used, is not required. Some recommend thin plank for a flat tier.

SIZES OF DELABOLE ROOFING SLATES.

	in	in	Weight of a thousand
Doubles	13	6	— 0 ton 3 qr
Ladies	16	8	— 1 1
Countesses	20	10	— 2 0
Duchesses	24	12	— 3 0
Rags and Queens	36	24	
Imperial and Patent	30	24	

For sizes of school slates, see stationery.

480 In stowing square slate, (sizes) use sufficient straw between each layer. Flooring slates, (slabs) are stowed on their edges. For the Australian Colonies and America, slate should be packed in boxes containing, say ten dozen in each, and large slabs should be enclosed in rough wooden cases to preserve the corners and edges.

481 *Yorkshire Landings and Paving* are stowed on edge fore and aft, so as to prevent breakage and have an equal bearing along the vessel.

At Odessa a Russian cubic sagan of cobblestones fit for pavement, is equal to 343 cubic feet English, and a square sagan of hard flagstones good for footpaths, 49 square feet English.

482 STORES. Spars and other articles necessary for a ship's use, are exempted by the Customs Consolidation Act 1863, from any general expression as cargo. A ship is allowed to carry as stores, one spare spar of each sort she requires to use, which are, or should be, reported in the "manifest" under the head of stores. The larger descriptions, such as lower masts or bowsprit pieces, are seldom carried except by the homeward-bound in the timber trade, which usually avail themselves of the opportunity independent of the cargo.

483 SUBSTANCES soluble in water, and therefore capable of receiving injury and of causing injury.

Aloes	Divi divi	Potash
Alum cake, or sulphate of alumina	Epsom salts or sulphate of magnesia	" carbonate
Acetate of lime	Galls, nut Aleppo	Potash, chlorate
Acetate of lead, or sugar of lead	Gamboge	" sulphate or sal enixum
Acetate of copper	Gelatine	" bichromate
Acetate of soda	Guano	" prussiate
Arsenic, or arsenic acid	Gum arabic, Tragacanth	Phosphate of soda
Argols or tartrates of potash	Glauber salts or sulphate of Soda	Quick-lime
Ammonia carbonate	Gum British or dextrine	Quinine
Ammonia Sulphate	Gunpowder	Rhubarb
Ammonia muriate or sal ammoniac	Honey	Sal prunella or saltpetre
Alkali or soda ash	Iceland Moss	Salt, common, or chloride of sodium
Barilla	Iron sulphate copperas or green vitriol	Sal ammoniac, or muriate of ammonia
Bleaching powder or chloride of lime	Kelp	Soda ash, or alkali
Borax or tincal	Lead, acetate or sugar lead	Soda carbonate
British gum	Lime	" bicarbonate
Brazil wood	Lime, acetate	" sulphate or salt cake
Catechu	" chloride	Snuff
Citric acid	" superphosphate	Soap
Copperas or sulphate of iron	Liquorice	Sugar
Cream of Tartar	Litmus	Tartar, cream of
Coffee	Lucifer matches	" salts
Chocolate	Magnesia, sulphate of or Epsom salts	Tartaric acid
Chloride of sodium or common salt	Natron or erude soda	Tea
Chlorate of potash	Nitrate of potash, saltpetre	Tincal, or crude borax
Camphor	Nitrate of soda, nitre, eubie nitre	Tobacco
Candy sugar	Oak bark	Trona, or erude soda
Candied fruits	Opium	Vitriol, blue, or sulphate of copper
Cantharides	Oxalic acid	green, or sulphate of iron
Copper sulphate, or blue vitriol	Oxalates of potash and soda	white, or sulphate of zinc
	Pearlash	Verdigris
		Yeast, German [vitriol]
		Zinc, sulphate or white

484 SUCCADES, ginger and various tropical green fruits preserved in syrup, usually packed in jars and then placed in cases having framework inside. As the jars are generally full and liable to leak, they should not be placed near any goods which may be injured by the syrup; the cases are very fragile and require much care in handling. Bombay ton 50 cubic feet.

485 SUGAR is obtained from the following places. The *West Indies*; British colonies, Jamaica, Trinidad, Barbadoes, Antigua, Tobago, Dominica, Grenada, St Vincent, St Lucia, and St Kitts; French, Martinique and Guadaloupe; and Spanish, Cuba, Havannah, Matanzas, and Porto Rico. *South America*; British, Demarara and Berbice; Dutch, Surinam; and Brazilian, Bahia, Maceio, Maroim or Maroin, Paraiba, and Pernambuco. *East Indies*—British colonial; Penang, Bengal, (cane and date), Dobah, Cossipore, Benares, Madras, Mauritius, and Port Natal; *East Indies*—Foreign; China, Siam, Manilla; Dutch, Java, Sourabaya, and Batavia; and French, Bourbon.

486 Ballast is unnecessary if the ship be tight, excepting with sugar in boxes, which stow more compactly in the 'tween decks than on the skin, and are liable to make the ship crank without ballast. Dunnage not less than 6 inches on the floor and 9 in the bilges, carried well up; it should be covered with mats for sugar in bags, to prevent the loose sugar from being wasted among the dunnage; see dunnage. To get two or three heights of hogsheads in low decked vessels the dunnage is sometimes diminished, but this is at the ship's risk. When the entire shipment consists of sugar, the hogsheads of the ground tier are placed close together, fore and aft, with strips of board up and down the ceiling; after which every hogshead is duly bedded and chocked with billets of wood, and the riding tiers stowed in the same manner. Not unfrequently where a third height cannot be had, it is usual to make up the balance of cargo with bags, barrels, or boxes of sugar; this, however, must depend upon the manner in which the sugar is shipped from the port of loading. When logwood is cut in the hold for dunnage, the saw-dust should be carefully removed; if wetted its color will seriously injure sugars and other goods. When coker nuts, logwood, sapan wood, piassava, canes, or any other article is used as dunnage, and carried at a low freight in consequence, care should be taken to have the words "may be used as dunnage," inserted on the bill of lading, or the ship will be liable for any damage sustained by such articles.

487 *West India*. After some West India sugars are boiled at the plantations, they are thrown into hogsheads (or tierces) the bottoms of which are pierced with holes to allow of the drainage of the syrup, from the sugar, into the molasses' cistern, over which they are placed. Frequently the hogsheads are packed before the drainage is complete, and the remainder of the syrup runs off on board the ship, causing a loss of weight which sometimes amounts to 16 ¢ cent. While the drainage at the plantations may amount to 25 ¢ cent of the weight, the reduction of the *bulk* of the sugar may not reach 10 ¢ cent, and this loss of stowage, coupled with defective packing, will sometimes admit the loose contents of five hogsheads, when shaken by conveyance to the wharf, to be packed into three. St Vincent hogsheads are generally well filled, and although rather smaller in size, weigh more than those of Jamaica, and much more than those of Berbice or Demarara. Where proper attention is not paid when screwing hogsheads in the hold, hoops are cut through and more loss occurs by wastage when unloading, than is gained by additional freight, especially if the cask is insecure and not full. For the stowage

of sugar and other West India produce see also general cargoes. West Indias are packed in hogsheads and tierces; the tierces 10 to 12 cwt. hogsheads 15 to 22 cwt, averaging about 16 cwt gross; tares about 16 ¢ cent. Cubas in hogsheads and tierces, commonly termed Cubas. Havannahs in boxes, about five to the ton gross weight, measuring on an average 3 ft 6 in long, 2 ft broad, and 1 ft 8 in deep—say 11 cubic feet; the average loss on Havannah cargoes is 2 to 2½ ¢ cent.

488 *South America.* Demarara (Guyana) sugars are in hogsheads; Bahias, Pernams, Maceios, &c. in chests 15 to 23 cwt, cases 8 to 10 cwt, and twilled calico bags 1½ cwt. At Bahia piassava is much used for dunnage; it is made up in bundles four feet long, six inches thick, and weighing about 28 lb. Three double bundles, 36 inches, compressed by the cargo to 18 inches, are laid on the ceiling from the kelson to above the bilges, and two double bundles up to the 'tween decks. The 'tween decks battened or cased. Piassava twines like ivy round the trunks of trees; it is an excellent substance for dunnage, not being liable to rot or to become heated; it will not ordinarily retain water, and air circulates freely through it. Piassava sells readily in England for the manufacture of brushes, brooms, &c. and is frequently used as a substitute for horse hair. Good wood dunnage is better for the flat of the floor than piassava, the compressed bundles of which retain leakage there and prevent it from running freely to the pumps. Coker nuts may also be used for dunnage at Bahia, &c. as they generally find a ready market on arrival.

489 *East India*—Colonial. Entire cargoes are frequently dunnaged with sapan wood and bamboos. At Calcutta, Dobah sugar in bags is perfectly dry, and there is not much tare. In the lower hold stow them right up to the beams, and use a sufficiency of hides (which should be previously engaged even at decreased freight) between the beams, and fill well above them. Cross the hides skilfully with bags of sugar, and the beams will be secured from unfair pressure. Hides need not be used in the square of the main hatch, for being in the middle of the ship it is desirable to place as much weight there, comparatively, as possible. The lower part is frequently trodden on in loading, and is therefore tolerably solid; if however there is any settlement, it must be right down on the sugar. Saltpetre in bags, if not packed separately, should be put under sugar; its specific gravity is greater, and it is liable to less injury from sugar than sugar is from saltpetre: nevertheless, sugar will alter the color of saltpetre, and it is better for both that they should not be stowed together. Some masters recommend a break of cowrie shells in bags, right athwart the hold, in the wake of the pump-casing, and to put the sugar one side and the saltpetre the other. E.I. sugars are liable to injury from indigo which see. A bag of E.I. sugar weighs from 1 to 2 cwt. A bazaar maund at Calcutta 84 lbs; two maunds 168 lbs, make a bag, and 13 bags go to a ton freight. Penangs are in double grass mats ½ to ¾ cwt. Madras in gunny bags, 1½ to 2½ cwt each. E.I.Co's ton for freight, 20 cwt in bags.

490 *Mauritius.* The dunnage, which is small brushwood, should be continued right up the side, to take off any leakage from the decks, chain-plates, or sides, as continual dropping only of salt water, will

ruin an entire bag, which in turn destroys others. When cargo is allowed to lie on the decks in the sun, previous to going into the hold, the pitch from the seams will greatly injure it; pitch and tar are very injurious to sugars. Capt. SEDGWICK recommends that where ships have 'tween decks laid, a few planks should be removed amidships, for if heavy weather is encountered, and the cargo in the hold is washed, that in the 'tween decks will fall in and preserve the ship from foundering. A tierce weighs 7 to 9 cwt, but it is usually shipped in mats or vaca bags averaging 1.36 cwt gross; the finer sorts in double vaca bags, the coarser in gunny bags inside vaca bags, $1\frac{1}{2}$ cwt each; tares, ordinarily $3\frac{1}{4}$ to 4 per cent.

491 *East India*—Foreign. Chinese sugar in casks is entitled to increased freight. Manilla is shipped in bags or bundles; when in hogsheads or boxes the drainage and tares are great. In single grass mats the weight is generally $\frac{1}{2}$ to $\frac{3}{4}$ cwt each; they often come to hand in bad condition. At Manilla, when hemp and other light cargo is freighted at 12 dollars per ton of 40 feet, sugars rate at 10 dollars per ton 20 cwt; sugars are often freighted by the picul which weighs 132 lb. Javas are packed in baskets 3 to 6 cwt, which when empty weigh from 20 to 30 lb each. At Batavia and some other ports, sugar is shipped in baskets or canisters, which occupy more space by 30 per cent than if in bags. The dunnage at Java, &c, is canes, which are used with advantage for the manufacture of chair seats.

492 Sugars in casks are mostly Muscovado sugar, *i.e.* partially drained of their syrups; by drainage in transit they not unfrequently lose 16 per cent of their weight. Clayed sugars are packed in boxes, cases, and chests, but principally in bags; through the syrups having been more perfectly separated from them they are but little liable to loss of weight in transit. Some unclayed sugars such as unclayed Manillas, low Bengals, Madras, and Khauris, are packed in mats and bags; khaur is an inferior article, very little better than molasses, and may lose 30 per cent through drainage. Syrup sugars should be stowed below every other part of the cargo, and as near the pump-well as possible, that the drainage may be drawn off more freely from the ceiling. With all sugar cargoes some provision is necessary for the ready access of drainage to the limbers; experienced masters open the lower part of the pump-casing full a quarter of an inch, and bore holes in the skin, but not in the shoulders, for the bilge water there would fly up when the ship lurches, and do serious injury to cargo. Crystallized sugars sometimes occupy less space in the packages at the end of the voyage than at the commencement, thereby giving the impression that the packages were not full on shipment; this operates against the weight stowed in a ship, and masters should act accordingly.

493 If possible brown sugar should be stowed under white to prevent damage from drainage, and damp sugars should be refused. Avoid those packed in a green state, as the moisture which results will be attributed to the ship, and deducted from the freight. After loading, one hatch ought always to be kept open, when practicable, to allow the steam to escape, as confinement without circulation is injurious to sugar as well as to many other articles. In the West Indies large bamboos are let

down into the cargo, leaving two or three feet above the level of the deck, to allow the steam to come up and fly off. All sugars are liable to steam, those in a green state especially, they are therefore never carried by first-class passenger ships, which take only fine dry sugars of the best quality. Ships carrying steaming sugars should use zinc paint which remains unchanged while white lead turns black. If the ship be already painted with lead, discoloration may be avoided by covering with white-wash of slaked lime, before loading. The injury from steaming is occasioned by sulphuretted hydrogen, which is very injurious to health; moistened lime or white-wash will absorb this gas and prevent such injury. All sugars are liable to great depredations from rats; see vermin. Sugar will by *contact* injure cutlery, marble, rope,—coir especially and other goods; by its *heat* fermentation and leakage from bottles and casks of ale, beer, wine, spirits, &c, will be created; and by its *steam*, which settles under the decks and drops or bales or chests below, teas and other delicate articles will be greatly deteriorated in value.

20 hogsheads averaging $16\frac{1}{2}$ cwt, equal to $16\frac{1}{2}$ ton, will occupy 850 cubic feet or 1 keel. E. I. Co's ton 20 cwt; Bombay 50 cub. feet soft sugar in chests, or 20 cwt in bags; Calcutta 39 feet; Mauritius 14 or 15 bags; Bahia 20 cwt in cases, boxes, or barrels, and 23 cwt in bags; New York 20 cwt. When wheat is freighted at 1s $\frac{1}{2}$ quarter, sugar should be at the rate of $5/10\frac{1}{2}$ $\frac{1}{2}$ ton.

An Admiralty barrel weighs 392 lb nett, $\frac{1}{2}$ hhd 280 lb, kilderkin 168, and small casks 140 and 112lb.

SUGAR TARES AT HAMBURG.

DRAFT 1 $\frac{1}{2}$ CENT.	{	Havanna, white, fine	{	$\frac{1}{2}$ box	
		middle and yellow		White	65lb
		yellow		Brown	70
		brown			
	{	Bahia, in cases, white, fine	{	In cases, white, 16 $\frac{1}{2}$ cent	
		" " middle		" brown 18	"
		" " and low		Bags	12
		" brown		Casks	14
	{	in bags, brown			
		Pernambuco, in cases, white, fine ...			
		" mid and low			
		in bags, white			
		" brown			
	{	Java, yellow and white	{	Baskets	12
		brown			
	{	East India } white and yellow ...	{		
		and China } brown			
	{	Mauritius, yellow and grey	{	In bags	5
		brown			
	Manilla				

A Brazil arroba of brown sugar usually renders from 27 to 28lb Hamburg weight; white sugar $27\frac{1}{2}$ to $28\frac{1}{2}$; Havana $21\frac{1}{2}$ to 22 lb.

112 lb English equal to 105 lb Hamburg.
110 lb " 101 lb Spanish.
100 lb " 108 lb French.

494 *Iron ships* are subject to injury from the drainage of sugar, especially if diluted with bilge water, as by fermentation acetic acid is formed, which dissolves the iron. The action of sugar on iron may be recognized by the brightness of surface induced. The iron will not be permanently protected with a white or red-lead paint; an iron paint composed of the peroxide of iron, which is of a reddish brown color, is the most effective; this covered with a thick coat of whitewash will so protect the iron that injury need not be feared. Between the skins powdered limestone may produce the same effect. To protect them from sugars, salt, saltpetre, &c. the holds of some iron ships are covered with asphalt (cement) which also answers for ballast.

495 Imports of sugar into the United Kingdom in 1856:

Colonial, i.e. East and West India, ... tons	275,000
Foreign,	110,000
Ditto refined, Belgium, Holland, &c.	10,000
Total	tons 395,000

496 **SULPHUR.** No ship can carry her full stowage; it is not desirable to employ vessels with conical holds in this trade, as sulphur has a tendency by its own weight, to wedge itself down when working at sea, and thus strain the ship. A ship laden with sulphur carries on an average 4 to 8 ¢ cent more than if with coal; but if the burthen in keels be known, and compared with the quantity of sulphur, the exact difference may be found, thus: by dividing the quantity delivered by 424 cwt, so many keels of sulphur are obtained, which multiplied by 97 quarters, less the difference of so much ¢ cent, will give the exact burthen in quarters. See brimstone. When Mediterranean wheat is freighted at 1s ¢ qr, sulphur should be 4/8 ¢ ton of 20 cwt.

497 **SURVEY.** See Protest.

498 **TALC.** A species of fossil nearly allied to mica. 20 cwt go to a ton at Bombay. E. I. Co. same.

499 **TALLOW** in casks is allowed to stow six heights; it should be placed as low down as possible for the sake of coolness. In the ports of the River Plate, tallow in pipes is ordinarily stowed as a ground tier, and receives a layer of bones or horns on which hides are placed. Tallow casks readily absorb salt water which will soon rot the wooden hoops used in St Petersburg; they are sometimes not strong enough to hold together until the ship is discharged, and when striking out cargo will fly off and leave the tallow unsupported; the crowbar should be used with caution. Tallow will melt if stowed near oats or other heat-producing goods. Mare's Grease is used in the manufacture of soap; it is almost like oil; in South America it is packed in square cases lined with zinc, or in tarred pipes, the hoops of which are nailed to keep them from slipping.

17 tons of tallow will occupy 850 cubic feet or 1 keel, being the same as for 10 tons clean hemp. At Bombay 20 cwt go to a ton; E. I. Co. 50 cubic feet; at New York 6 barrels. A ton of Baltic tallow is freighted same as 3/4 ds freight

of clean hemp on the gross weight, and when Black Sea wheat is 4s 7-070 $\frac{1}{2}$ quarter freight, tallow should be 30s $\frac{1}{2}$ ton; see table, page 23. When Mediterranean wheat is 1s $\frac{1}{2}$ quarter freight, tallow in casks should be 6/8 $\frac{1}{2}$ ton of 20 cwt. Tallow pays $\frac{1}{3}$ ds the freight of clean hemp or flax on the gross weight, and the freight per ton of tallow multiplied by 3 and divided by 20 will give the proportionate rate payable on a quarter of wheat.

Russian tallows are in casks 8 ft by 6, containing 12 $\frac{1}{2}$ to 13 cwt; and 6 ft by 4, 9 $\frac{1}{2}$ cwt. gross. 120 poods gross weight make a Petersburg last; 63 poods an English ton. A pood is 36 lb.

500 TAMARINDS. 20 cwt go to a ton at Bombay. E.I.Co. 18cwt.

501 TAPIOCA. At Bahia 16 cwt in bags and 14 cwt in barrels go to a ton. A barrel weighs about 1 $\frac{1}{2}$ cwt.

502 TAR. A full cargo does not require ballast except the ship be large, when about 30 to every 500 tons burthen will be necessary. Some stevedores recommend the skin and ceiling to be covered with sawdust sprinkled with water, to prevent leakage from running into the pumps, which require special attention with this description of cargo. When tar and turpentine go together the former should be stowed in the extremities, to avoid pressure, and to keep it off from the pumps. Place the barrels each side the kelson, bilge and cutline with each other, with small billets of wood between, to prevent working at sea. From America to Europe it is usual to have some turpentine ready to throw down the pumps when choked, as being the only available substance by which tar can be dissolved. Pumps fitted with long loose wood toggles, instead of leather clappers, will, it is said, raise tar. Tar, turpentine, rosin, &c, should have flat beds of wood under the quarters, an inch thick, and allowed to stow six heights. Tar taints and injures many descriptions of goods. See the article flour.

503 Tar is very liable to leak. At Archangel it is put into the barrels at a temperature of about 40 degrees, and then sent to England, where the temperature may be 60, and re-shipped for the East and West Indies, where the temperature may be 96 deg. which will cause an expansion of 4 $\frac{1}{2}$ cent, and a consequent leakage. It is recommended to put only 32 gallons into a 34 gallon cask.

504 Many fatal results to seamen and passengers are caused by the noxious gas which emanates from coal tar in broach, in the forehold, where it is too frequently kept. The timbers of the ill-fated *Eclair*, afterwards called the *Rosamond*, were saturated with coal-tar as an antidote for dry rot, and to this circumstance is attributed the malignant fever which carried off her crew. Coal tar for present use is recommended to be kept in an iron cask, lashed on the fore part of the upper deck.

100 barrels of tar 16 ton, 100 barrels of Stockholm tar 16 ton, 186 barrels American tar and rosin 17 ton, will occupy 880 cubic feet or 1 keel. When wheat is 1s $\frac{1}{2}$ quarter freight, Archangel tar should be 11 $\frac{1}{2}$ d $\frac{1}{2}$ barrel, and American 8 $\frac{1}{2}$ d. E.I.Co 8 barrels to a ton; New York same. A barrel of tar weighs 3 $\frac{1}{2}$ cwt; a last consists of 12 barrels.

505 TARES and Allowances according to the practice of the London Waterside Customs. In cases where goods cannot conveniently be weighed nett, the weight of package, all internal wrappers, papers, strings, &c. should be ascertained and deducted from the gross, to produce nett weight; this is termed taring, and is practised in the following several ways, viz :—

By actual Tare. Turn out the goods, take the weight of each package and enclosure, which deduct from the gross. This is performed by landing-waiters, all other descriptions of tare being settled and written off in words at length, with initials and date, by landing surveyors.

By Average. When packages vary little from each other a limited portion is selected by the landing officers, their contents turned out, and from them, when tared by the landing surveyor, an average is struck, and allowed upon the whole number.

By per Centage. When packages vary considerably with one another in their gross weights, but bear a relative proportion, it is usual to select a few differing that shall altogether equal the average weight, then turn out, tare, and convert these into either a per centage or a per package rate, and apply as before.

By Allowed Tare. This is an adjudged or estimated allowance, agreed upon by the landing surveyor and the merchant or his agent, and applied either per package, per cent, or by proportionate deduction, as may be most convenient.

By a Super Tare is meant a special allowance granted for the increase of weight a package may have imbibed in a leaky ship; or when gross weight regulates the tare, as in British plantation casks of sugar, from part of the contents being washed out.

Draft is now allowed by the Customs on the article of tobacco alone.

N.B. Tares once adjusted by the landing officers in conjunction with the merchant or his representative, must stand as final, G.O. No 114, 1848; and officers are strictly enjoined not to take any cognizance of goods after they shall have been passed and delivered, without the express sanction of the Board. G.O. No 63, 1850.

506 TEA. The heavier the ballast the better; it is generally metal, or granite, which is built in; these are covered with shingle, and about three-fourths of the whole are levelled over the kelson, on a level with it, or below it, as the case may be—the depth being regulated by a guage to receive so many heights of chests between the beams and the ballast, which is first covered with half-inch fir. The Chinese stevedores are not surpassed for good stowage, in any part of the world, and the course usually observed by them at Canton with, say a ship of 500 tons register, has been thus described :—“Tiers of chests are laid fore and aft, say five from side to side—amidships eight tiers. Take a set “between the midship tiers and end tiers and set them up square and “tight; then three or five tiers more, both midships and aft, and set them “up perfectly square, from one wing to the other; if the tiers come in regularly up to the meeting of the chests, they are dropped in, but if they “require setting, the whole tiers are set upon and the last dropped in. “This tier when completed, is guaged in like manner as the ballast, from “underneath the beams, to see they are perfectly level. Slips of wood

"are put on should there be the least hollow; should any chest stand high it is lifted, and the ballast robbed to make the tier level, but should the deviation not exceed one-eighth of an inch, the mere jumping on the chest will do. The guage is then lessened one tier, and it is carefully tried fore and aft, to see there is no discrepancy. This method is pursued up to underneath the beams, and when that is completed, if no convenient chests can be had to suit the height of the beams, the beam-fillings are five and ten catty boxes, placed so as to make a level as near as possible, and all deficiencies filled in with China fir. Great care is taken with this tier, the height being measured from the upper beams, and the stowing goes on as it did below. When the deck beams are reached, caution is necessary in order to make the stowage of the ship advantageous to the owner, as it is not always that chests are to be had to suit the filling close up to the upper deck—five-catty boxes, being the least to fill up a space often 14 by 12 inches. On rising from the ballast in the lower hold, close to the skin, from the fore shoulder to abreast the mainmast, it is necessary to keep the tea at least nine inches from the side."

507 The lower tier should be on their bottoms, because the soldering is more perfect; but the chests are sometimes stowed on their sides for the sake of getting in heights. The other tiers on their sides or edges, as they will come in for heights. Some guages are in the form of a light square frame, others are formed like a capital T, but they are not so reliable as square frames, on account of the occasional inequality of the hold beams, oak especially, the hollows of which might not be detected with T frames; sometimes a simple measuring rod is used, at others two half rods, sliding gunter fashion.

508 Strips of bamboo should be nailed up and down the side lining, and over the deck, to preserve the tea-boxes from the influence of chafe, and from damage by leakage; by its silicious exterior bamboo resists wet and carries it off. The heat of the tea, like many other dry cargoes, will draw dampness from any porous stone previously in contact with water. Some ballast from Australia is very unsuitable; many cargoes have been delivered in London out of condition and flat, in consequence of being stowed on Sydney ballast, which is a porous sandstone. It is better to leave out the wing chests, for if wetted one inch it will run through the whole chest; occasionally half-chests are stowed here, but they must be well ballasted off from the skin. Chests of tea are oiled before shipment, in order to assist in protecting them from leakages. In the wings are occasionally stowed the remaining fourth of the ballast, or (in American ships) mats of cassia; for it sometimes happens that this portion of the ballast is required to trim the ship, either forward or aft, in which case the wings must be filled with something else. Granite is dear in the north of China, but reasonable at Canton.

509 All the throats of the beams should be muffled with canvas, or sennet should be nailed across the upper part, and led down so as to train any leakage towards the sides, and thus prevent water from running along the beams to the stanchions, where it will edge off and fall into the centre of the cargo. It is particularly necessary to muffle the beams

in the wake of the fore top-mast back-stay bolts; it would be prudent also to do so immediately below all scuppers. Damage from causes mentioned here seldom amounts to *an average*; and the insurer, being freed, the loss falls on the merchant, who would have some difficulty to establish a claim on the ship for bad stowage or insufficient dunnage, but he would afterwards prefer chartering some other ship, on board which more caution is observed.

510 At Canton, where the seller pays the export duty, tare is taken between the merchant and officer of Customs, by each party selecting so many chests out of every 100, which, being first weighed in gross, are afterwards tared, and the average is assumed as the tare of the whole. On this principle the tares of other goods in packages are taken. At the other Chinese ports the buyer is responsible for the duty, which is paid upon the same weights as he pays the native merchants. In a parcel of 600 chests (which is a chop of Congou tea) 20 chests are selected by the buyer, and weighed for the gross; 10 others are also selected by him and, their contents being turned out, they are weighed for tare. The result, nett weight, is adopted by seller, buyer, and customs' officer; the latter is never present, but reserves to himself the right to re-weigh if he has any cause for suspicion.

511 Catty boxes could be procured only at Canton formerly, now they are to be had at all the ports, but not so plentifully as at Canton; they are shipped in bundles of four tied together, and if so delivered in London, receive full freight; if the rattan is cut and the boxes used for small stowage, half freight only is paid. Tea ships will stow 50 to 60 ¢ cent over their register tonnage, and so much as 75 if supplied with an assortment of catty or other small boxes. American ships for the United States, will fill every crevice with cassia in mats, fire crackers in small boxes, and 10-catty boxes, and half chests of green tea, for the bulk of the tea shipped at Shanghai for the United States is green, which is seldom packed in any thing larger than half-chests and boxes. Occasionally a few hundred chests are put in, and sometimes a few hundred chests and half-chests of black tea. At Foo Choo a large quantity of half-chests of black tea, (Oolong and Ning Yung) and some thousands of boxes of black tea, are shipped for the United States. All teas shipped for America are matted and therefore more liable to damage if only partially wetted; large quantities of matting in rolls, are also shipped as cargo, with teas.

512 Some merchants object to the importation of any other article whatever, excepting silk, in the same hold with tea; silk, however, contains moisture, and when in large quantities, is said to injure tea. The presence of even 20 chests of rhubarb may give a cargo of tea a bad character. Sugar is prohibited in China, as its fumes are highly injurious. Cassia is never put into a tea cargo for England; for America cassia in mats is always shipped without prejudice to the cargo; the mats which contain 1 lb and 2 lb each, are stowed under the beams, &c. and where nothing else will go. Partridge canes and small bamboo sticks (used for umbrellas, &c.) are often shipped at Canton at a low freight for dunnage, and so expressed in the bill of lading. Great care should be taken to keep tea apart from any article likely to create strong

fumes; from ship chandlery of every description, from boatswain's stores such as ropes, cordage, and sails, the latter having much tar in the roping and seaming: these stores should be all stowed on the upper deck, the seams of which require to be examined frequently on the voyage home, for the damage done to one chest will often destroy many others near.

513 Tight ships in the China trade are more liable to injure their cargoes than ships which leak a little, as the effluvia from the bilge water of tight ships will be more injurious, especially where there are 'tween decks. Bilge water naturally affects tea; and where a ship is tight, clean water should be let down and pumped up again, at least once every week. Sir William Burnett's fluid, or a pint of chloride of lime in each bucket of water, will be very efficacious. The bilge water in ships carrying rice exhales an effluvia of the most obnoxious character; when it falls into the bilges it ferments speedily, and cargoes of coffee especially, have been greatly damaged thereby. Bilge water impregnated with fermented rice has been known when the pumps are used, to turn the white paint of a ship's mainmast, to a bluish lead color, and to injure in the same manner, the new paint of a ship lying alongside. Split or whole peas, Indian corn, grain, &c. bottled beer in straw, &c. are very injurious. Some contend that every ship carrying tea should be provided with bilge pumps, and that no ship which has carried grain, sugar, coal, or any similar cargo, should take in tea before her hold has been washed with lime water, and every particle of the old cargo extracted from the ballast and the bilges. The bilge water from oak, (Yorkshire especially) and East India teak built ships, is very offensive. Oak and other hard woods eat out and rust iron bolts, spikes, nails, &c. and generate verdigris from copper, which increases the offensiveness of bilge water. Ships built of American pine or other resinous woods, do not generate bilge water so injurious, and their cargoes do not suffer to such an extent.

514 On the voyage home, it is highly necessary to keep a tea cargo perfectly dry, for this reason every precaution should be adopted. Leakage not unfrequently occurs through the scupper holes; the flange or leaden lip of the scupper is often tripped up by the gunwale of a barge or boat lying alongside; the copper nail is loosened and subsequently knocked out, and leakage ensues. When the scupper gets choked with a piece of coal or any such substance, a broom-stick, iron rod, or crowbar, is thrust in without caution, the scupper lining is stabbed, and a concealed leak is created. Leaks are sometimes hidden for a long time by occurring behind the pipe of the head pump.

515 After heavy weather, one of the first places where leakage occurs, is round the fore top-mast backstay bolts. There is always a heavy strain here from the jib-boom, flying jib-boom, and head sails, caused by the jerking strain which is created when the ship falls forward in the trough of a heavy sea. The water first obtains slight access in the after parts; the ship goes into harbour, and the bolts rust; she goes to sea again, when the strain works off the rust and more water is admitted. Fire-tarred iron bolts one-sixteenth or even one-eighth of an inch larger, should be inserted, and they should afterwards be watched carefully. For other leakage liabilities see "mate."

516 Merchants complain that teas and silks are often damaged by being stowed in the poop or cabin, where they get wet from leaks, or by heavy seas coming over the vessel, which must find their way down the companions or sky-lights. Not being under hatches such goods are considered not lawfully stowed.

517 All packages of tea are frapped round with wet rattans (split) which become dry and hard. The Chinese tie them here and there, with knots $\frac{1}{4}$ inch and occasionally $\frac{1}{2}$ in high, but pressed nearly flat in the hold; these are of course reckoned in the measurement for freight. When breaking out tiers in the hold, with cotton hooks or otherwise, if due caution is not observed the rattans will be torn off, and on re-measurement the ship will suffer. By the breaking of chests and bursting at the corners in handling, a cargo of tea will, on delivery in England, measure 2 to 4 per cent more than when shipped in China. Some callipers have fine brass facings capable of measuring with great correctness to the sixteenth of an inch.

518 For America, teas are measured in China, the freight agreed on, and stated in the face of the bill of lading; such statement is not binding, and the master has a right to re-measure on delivery; but the right is seldom exercised in the United States. The callipers used in China are peculiar to the China trade; they were invented by an American merchant and are called Stansbury's measuring rod. It is accompanied by a table of logarithms, is wonderfully accurate, and saves much time. These callipers also have very fine brass facings.

519 With tea in a general cargo, dunnage bottom 9 inches, bilge 14, sides $2\frac{1}{4}$ inches. Tea is injured by being stowed in the same hold with salt, sugar, turpentine, guano, and other vapour-producing, and damp commodities. Hops have been known to destroy the flavour of gunpowder tea when stowed near for a short time only, and would more readily destroy the flavour of all other kinds; see general cargo. When the boxes are passed through the bonded warehouses at the Custom house, a piece of lead on the top of the chest is cut on three sides to take out samples, and flapped back again immediately, but it is not soldered, so that the tea is then much more liable to injury; in China this would cause the tea to spoil in two or three weeks. Tea will keep in England, London especially, for four or five years, while in China it cannot be kept until the following season without serious injury.

520 Tea averages rather more than 9 cwt to a ton of 50 cubic feet. Taking the weight of tea (cargo with cargo) 50 feet will average 1,200 lb, which is $10\frac{1}{4}$ cwt. In China, when estimating what a ship will carry, the register tonnage *n.m.* is multiplied by 1200 lb per ton—say 800 tons register 960,000 lb nett of tea. To an English ton of 50 feet, $10\frac{1}{4}$ chests of congou are usually allowed; to an American ton of 40 feet, $11\frac{1}{4}$ half chests. Green teas are heavier than black, hence cargoes for America weigh more per 100 measurement tons, than those for England, but as American ships take other and light goods, there is no available scale of estimate. At Bengal, Madras, and Bombay, 50 cubic feet in chests go to a ton; at New York 8 cwt green. 8 chests of congou go to a coast-

ing ton in England. The Admiralty allows 9 chests or 18 half-chests to a ton, and 32 tea canisters of 20 lb. or 60 of 10 lb; an Admiralty chest weighs 83 lb. nett, half-chest 36 lb. Fine teas weigh heavier than common.

AVERAGE WEIGHTS AND TARES. AND MEASUREMENTS OF DIFFERENT DESCRIPTIONS OF TEA.

Description.	Weight.		Tares	Length	Breadth	Depth	Cubical Contents	
	cwt	q lb	lb	in	in	in	ft	in
Congou, chests	1	0	0	25	23	17	5	2
" $\frac{1}{2}$ -chests	0	2	0	16	18	15	2	8
Souchong chests	1	0	0	26	23	17	5	2
" $\frac{1}{2}$ -chests	0	2	0	16	19	14	2	7
Orange Pekoe	0	2	16	16	19	14	2	9
" catties	0	0	27	7	12	12	1	0
Caper "	0	0	27	7	12	12	1	0
Young Hyson, $\frac{1}{2}$ -chest	0	2	18	15	17	18	3	7
" catties ..	0	0	22	6	12	12	1	0
Gunpowder $\frac{1}{2}$ -chests ..	0	2	24	16	17	18	3	7
" catties ..	0	0	24	6	12	12	1	0
Imperial $\frac{1}{2}$ -chests	0	2	16	16	17	18	3	7
Twankay chests, square	0	3	8	18	19	22	4	7
" $\frac{1}{2}$ -chests	0	2	0	14	18	18	3	9
Hyson chests	0	3	2	18	19	22	4	7
" $\frac{1}{2}$ -chests	0	2	0	14	17	17	3	4

This table although prepared by an eminent London firm, must not be relied on as correct in every case. Another authority says, the cubical contents of a chest of congou, is 4.685 feet, and of souchong 4.825, and that all the others vary so much it is scarcely possible to give even an average scale. A merchant who has had fifteen years experience in China, remarks that the above sizes are all too high; a chest of congou at 5 feet 2 inches will not go $10\frac{1}{2}$ to a ton of 50 cubic feet. He considers 4 ft 7 in to 4 ft 8 in an average for black tea, and 3 ft 2 in to 3 ft 4 in an average for half-chests of green. He also considers the tares 10 ¢ cent too high; that 25 lb is an extreme tare for Congou, and that 23 lb is much nearer the mark. Another merchant thinks 23 to 24 lb nearer the average tare on congous, and 25 to 26 lb on souchongs. According to *Morrison's Chinese Commercial Guide*, published at Canton in 1848, the following are the usual nett weights and sizes of packages of tea.

Congo,	chest weighs 63 @ 63 catties	measures 4.085	cub. ft.
Souchong	" 60 @ 62 "	4.025	"
Pekoe	" 49 @ 50 "	4.333	"
Hyson	" 48 @ 50 "	4.000	"
Hyson Skin	" 48 @ 50 "	4.125	"
Twankay long	" 62 @ 65 "	4.864	"
Gunpowder	" 80 @ 84 "	4.100	"
Imperial	" 70 @ 74 "	4.074	"
Young Hyson	" 70 @ 72 "	4.220	"

100 Catties make a pecul which is estimated at $133\frac{1}{2}$ lb avoirdupois.

OTHER CHINESE EXPORTS.

(Extracted from *Morrison's Chinese Commercial Guide*, published at Canton, 1848.)

Approximate cubic measurement of Export in feet and decimals, allowing for the packages being matted, with the number of packages in a ton of each description of goods, at 50 cubic feet per ton, as rated in the English ships.

	Cubical contents,	feet dec.	No. of packages per ton.
Raw silk, 9 bundles in a box .....each box	7.112		7.216 boxes
Raw silk, each bale containing 1 pecul, bale	6.471		7 & bales 4.703 ft
Nankeen, blue, 50 pieces in a box,..... box	8.333		15 boxes
Do, Company's long, 100 pieces in a box „	8.333		15 „
Do, do. short 100 „ „ „	2.200		25 „
Cassia, each box containing a pecul, „ „	10.142		4 „ and 9.432 ft.
Do. each box containing half a pecul, „ „	6.950		7 „ and 1.35 ft.
Cassia buds, each box containing a pecul, „ „	6.500		7 „ and 4½ ft.
Rhubarb, „ „ half a pecul, „ „	8.333		15 „ or 8 pcl. bxs,
Tortoise-shell „ „ a pecul, „ „	9.000		6 „ average.
Star aniseed „ „ half a pecul, „ „	4.000		12½ „ or 6 peculs.
Vermilion „ „ 90 papers. „ „	1.000		50 „
Musk „ „ a pecul, about „ „	8.000		6½ „ average.
Camphor and gamboge „ a pecul „ „	4.640		12 „ and 1.232 ft.
China-root, and turmeric in bags			12 peculs to a ton.
Galangal in bags			13½ „
Sweetmeats, box of 6 jars, each box 2½ ft.			22 boxes „
Sweetmeats, box of 4 jars,..... „ 2			25 „ „
Liche or sugar candy in tubs, „ 3			16½ „ „

MEASUREMENT OF SILK PIECE GOODS.

pes	Cub. feet	No. to a ton	pes	Cub. feet	No. to a ton
25 handkerchiefs, ea box	2½	21	25 Canton crape, ea box	2½	20
25 sarsnet, „	2½	20	50 shawls, „	2	25
25 satin, „	3½	15	50 pieces dresses, „	2	25
25 Nanking crape, „	2½	21	25 „ lutestring, „	2	25

The following solid contents are calculated at 40 cubic feet per ton, being the measurement as estimated in American ships trading to China.

	feet dec.
Raw Silk, tsatlee <i>Average measurement</i>	per box 8.57
Do. taysaam	7.68
Rhubarb in cases containing 1 pecul,	6.112
Do. in „ „ ½ „ „	3.126
Vermilion, in cases containing 50 catties,	0.272
Camphor, in „ „ 1 pecul,	4.112
Aniseed oil, in cases „ „ 1 „ „	5.16
Do. do. in „ „ ½ „ „	2.564
Cassia oil, in „ „ ½ „ „	2.80
Do. in „ „ 1 „ „	5.45
Casia buds in „ „ 1 „ „	4.688
Gamboge, in „ „ 1 „ „	4.236
Dragons' blood in „ „ 1 „ „	7.432
Palm-leaf fans	9.886
Fire-crackers, half boxes	3.327
Preserves, in cases of 6 jars	1.791
Blue Nankeens,	2.692
Sewing silk,	1.213

521 **TERRA JAPONICA**, the old pharmaceutical signification of the substance now called Catechu, which in Japanese signifies the juice of a tree. It is an extract from the *Acacia Catechu*, an astringent substance of tan and extractive matter, imported chiefly from Bengal and Bombay; its principal use is in medicine. At Singapore *Terra Japonica* or *Gambea* is of a sticky character, and should be kept off from sago, coffee, and all kinds of Singapore spices, &c. It is sometimes packed in rattan baskets, holding about 1 cwt each.

522 **TIER** implies a range of casks or packages in the hold, hence the ground tier or that which is next the keelson, the second tier, third, upper, &c.

523 **TILES**. 1 plain tile is $10\frac{1}{4}$ inches long, $6\frac{1}{4}$ in wide, $\frac{3}{4}$ in thick, and weighs 2 lb 5 oz. 1000 plain tiles make 1 load and weigh 21 cwt. A pan-tile is $13\frac{1}{4}$ in long, $9\frac{1}{4}$ wide, and $\frac{3}{4}$ in thick, and weighs 4 lb 11 oz. 1000 pantiles weigh 42 cwt.

524 **TIMBER**, squared, is in most countries freighted by the load of 50 cubic feet; rough 40 cubic feet. Lathwood, plank, deals, staves, &c. are computed according to length and thickness, but the computations vary at different ports; and as they often tell against the ship, special attention must be given to prevent an undue proportion of sorts or sizes which do not stow well. Most of the standard sizes adopted by Russia, Prussia, Norway, Quebec, &c. will be found at the conclusion of this article.

525 *Canada, New Brunswick, and Nova Scotia*. On arrival at the port of loading it is necessary, if the ship is crank and will not stand or bear transporting without much ballast, to keep in considerably more than may be required for the stowage; the surplus is removed in batteaux or craft, after the ship is stiffened by a tier or two of timber. This is especially the case at Quebec, where the loading berths are often at a distance from the ballast ground, and the tide runs very strong, which increases the hazard. The quantity of ballast to be kept in and stowed away with the cargo, must be regulated by the ordinary stability of the ship and the specific gravity of the cargo. When there is a large proportion of hard wood, ships, unless very crank, require only a little ballast; but as about 20 tons can be stowed away without material loss of cargo space, and much delay and inconvenience, and sometimes loss, results from crankness after loading, it will be better to err on the safe side, and have too much rather than too little. Generally it is found that about 20 to 30 tons will be sufficient for ships of 400 to 500 tons register, with an ordinary cargo of assorted timber; they frequently take 60 tons or more, but if so much is always required, it would be better to keep copper dross (which is often to be had at moderate cost in England) or other heavy ballast, permanently on board. Indeed the first cost of a certain quantity of kentledge, would soon be repaid where a crank ship is constantly employed in the timber trade. Where there is kentledge, copper dross, or other heavy ballast, it should be stowed as near the keelson or centre as possible, and the lighter ballast in the wings. Ships may also be trimmed by the heavy ballast, so as to facilitate their loading when the ports are placed low in the ship.

526 Large deck loads of one, and sometimes of two tiers of timber are generally carried; this tends to increase crankness, but as deck loads are not allowed by the Customs in American Colonial ports, after the first of September, less ballast would then be required. Unless a ship is decidedly stiff it would be always advisable to keep in all the ballast which can be stowed away with cargo without loss of cargo space.

527 Trench the ballast up from the keelson towards the wings, so that the ground tier shall lie firmly on the ceiling. For the ground tier some masters select pine in preference to hard wood; if pressed it will not injure the ceiling so much; the tiers should not be so long as to allow the ends of the logs to rest on the rise of the ceiling at either end of the ship. Let them run sufficiently short, say three inches off the ceiling, to prevent the corners from injuring it by the pressure of the upper cargo; for want of this precaution the ceiling is often injured, butts are started, and ships sometimes water logged. If suitable lengths can be had, all hard wood should be stowed in the bottom—the ground tier perhaps excepted. Great care should be taken to secure a fair bearing for the lower tiers on the ship's bottom, to prevent undue weight on any part of the ceiling. Stow the spare ballast at the ends of the ground, second, and third tiers, &c.

528 After stowing three or four tiers (all the ballast being stowed away at the ends and wings) and the round of the bilge is cleared, wedge the upper tier tight fore and aft, to prevent shifting, and wedge every subsequent flat tier as it is laid, until you begin to staple up. Endeavour to prevent the butts or joints of one tier from falling directly over those of the tier below, otherwise the cargo will not be so firm. When about four and a half feet from the hold beams, or when there is barely space enough left for a man to move about under them, begin to staple up each side the hold to the beams, with two or three heights, as they best suit for filling up under them. Then fill in regularly from both sides, until there is only sufficient space left for a trunkway, which can be filled with one or two pieces, according to the space, and which will come in from the port; or with deals. Wedge off fore and aft, and in the midship part of the ship, up under the beams; the wedges should not be too short, or they will be liable to work out at sea; they should be driven in lengthways with the beams, *i. e.* athwart the ship; if driven in fore and aft they are liable to work out by the pitching of the ship. Great caution must be used when stowing the beam fillings, that the timber be risen one and a half to two inches above the beams, thus preventing them from being injured by the weight of the 'twixt-deck timber, when the ship works at sea. Keep the ends of the tiers in the 'twixt decks well off from the ceiling at each end, say three inches. Wedge the first tier off, and then begin to staple up against the sides, with two or three heights, as the timber happens to run best for sizes; and be sure to wedge all the upper deck beams as you come out towards the middle of the ship, filling in with broken stowage, where the space requires it. Finish the 'twixt decks in the same manner as in the main hold. Do not allow the timber to rest on the half-deck nor on the fore-castle deck, because they are not likely to be sufficiently wedged underneath to bear the pressure.

529 It is customary to select the best and largest timber for the upper tiers in the lower hold, and for the 'twixt decks, as there is plenty of space in both places, and the necessity for cutting or reducing is avoided; besides which, when discharging, the good timber is more speedily got at. At Quebec, Red and Yellow Pine is shipped in large quantities; the red is heavier than the yellow, and should therefore be placed below; and being smaller, it causes less break of stowage than it would among the large timber above and in the 'twixt decks; there is a difference of about 2s to 4s \textsterling load in favour of yellow as compared with red pine. A piece of timber 50 feet long and 12 inches square, measures 50 feet or 1 load for freight; as it increases in size the measurement tells much in favor of the ship; thus—17 inches measures double, 21 treble, 24 four times, and 27 inches five times that quantity. It is therefore advisable when practicable, for masters of capacious ships, to select large in preference to small pine.

530 *Deals.* Where the cargo consists entirely or principally of deals, time and expense (about 1s \textsterling load) may be saved in loading and discharging, but such a cargo is not otherwise advantageous to the ship; in the first place the computation for freight is a loss as compared with timber, of 10 per cent. A Petersburg standard hundred of deals contains 3 loads 15 feet. Whereas the usual computation for freight would be only three times that fixed for timber—thus fifteen feet would be lost on every standard hundred. Where deals are well manufactured they stow closer than timber which nearly makes up the difference. Floated and second quality deals, particularly in the lower ports of New Brunswick and Nova Scotia, are generally thicker than reputed, and although nominally only 3, are sometimes full $3\frac{1}{4}$ or even $3\frac{1}{2}$ inches. This must make great difference in many thousand deals, of which an entire cargo would consist. From Canada, bright deals are much more advantageous than floated.

531 *Pillars.* Where pillars are kept up under the beams and not regularly secured by knee fastenings, great care must be observed to secure them well before the commencement of loading, and to see that while loading there is no undue pressure on them, especially if of iron. The space between the timber, on each side the pillars, should be filled with deals (where practicable) deal ends, lathwood, or staves, and the timber each side should be well chocked.

532 *Hold Ports.* While loading in the American ports and at Sierra Leone, it often occurs that before the completion of the lower hold or of the 'tween decks, the cill of the ports is brought down so near the water's edge as to render it necessary to put in one or even two pieces, which should be well secured against leakage. To complete the loading it is of course necessary to pass the timber through the diminished opening, and it is therefore prudent to reserve those barks which will go in readily. It is frequently the practice to trim the ship by the stern, by passing broken stowage, chain cables, &c. aft, as far as practicable; this mode of raising the cill from the water, is termed "gaining port".

533 In shipments from *Memel and Riga* the same attention is not absolutely so necessary as in America—the timber being of one uniform diameter, the stowage is greatly facilitated. However, when masts, in conjunction with wainscot logs, are shipped there, which is frequently the case, too much care cannot be observed, or the bad stowage will be fatal to the ship's measuring out well at the port of discharge. At *Dantzic* similar precaution should be observed as in America, because the timber is of diversified dimensions, almost similar to that from Canada and Nova Scotia. When the cargo consists of both red and white deals the red should be taken in first as they are much heavier than the white.

534 *Battens*. An entire cargo is much against the ship compared with deals, at the same proportionate rate of freight.

535 *Sierra Leone*. Ballast is seldom or never required, except a little to level off or make firm the ground tier; more would be unadvisable, as ships are very deep with a full lading properly stowed. The cargo is stowed similar to other timber; but on account of the crookedness and unevenness of the logs, the peculiar lengths, the prohibition of cutting, and want of broken stowage, it is more difficult to manage. With bow ports, it is advisable to make a brow to protect the breast-hooks, and to place ballast or other rubbish to receive the fall of the timber of the first tier. The pumps should either be hoisted up or well looked after, as the timber, being generally muddy, runs in very fast; many pumps have been broken for want of this precaution. As much of the mud as possible should be first scrubbed off the timber while at the port, and every tier should be dry limed, to absorb the remainder and prevent pernicious effluvia. Particular care must be taken to have the lower logs fairly and evenly placed on the ship's bottom, so that the weight of the cargo may be equally distributed over the floors and first futtocks; and to keep the ends of the timber free from the skin.

536 Endeavour to keep the tiers as level as possible; work large timber with large, small with small; put the crooked logs together so as to lay one into the other, and work crooked timber round the bows or in the after end, to prevent the main work from being thrown out. When it is not possible to work the large with large, and the small with small, it may be advisable to have a tier of large say of five one side, and a tier of lesser, say six or seven on the other. As there is no broken stowage, with the exception of cam-wood, which is rarely obtained, and then in most instances when ships are loaded, it is of little service as stowage. Great care is requisite to chock the tiers well off to prevent the cargo from shifting; any quantity of log-ends and wedges, for that purpose, may be had from the shore. The tiers above the beams are seldom stowed as well as those in the lower hold, on account of want of room to manœuvre the crooked logs, and from the necessity of running in a great number of logs promiscuously, to trim the ship by the stern and gain port, to finish the lading of the lower hold in safety, as the cargo is often received in an open bay, exposed at times to a heavy sea. Careful attention is therefore required to chocking and wedging off of the 'tween decks. To prevent loss it is advisable to get in all timber during the day, as at night the sea breeze blows strongly, and tornadoes sometimes occur.

537 As logs under 23 feet long are paid two-thirds freight, and under 18 feet half freight, it is desirable that the master should bear this in mind when ordering his beam fillings, and ascertain by measurement, that logs sent off as 23 feet and 18 feet, do not fall short of those lengths *even by an inch*, on any side, or reduction of freight will follow.

538 *Leghorn and Ancona*. Timber shipped from these ports, being very crooked, requires the same attention as that of Sierra Leone.

539 *Mahogany* from *Cuba* and *Hayti* is generally exported in logs from 20 to 26 inches square, and 10 feet long; from *Honduras* 2 to 4 feet square, and 12 or 14 feet long, but some logs are much larger. Spanish is the lightest and Bay wood the heaviest sort of mahogany. 48 feet go to a ton, sometimes 20 cwt as weighed at the Queen's beam; at New York 40 feet; at Belize 47 and sometimes 50 feet.

540 Ships laden with *Teak* do not carry very much more than their register tonnage; some kinds are so heavy that they will soon sink, and by the rules of the port at *Moulmein*, the ship is required to weigh up that which goes down alongside; care must therefore be taken, when casting rafts adrift, to see there are no sinking pieces among them. For exportation it is all sawn and squared—not equal sided. *Rangoon* teak is considered better than *Moulmein*. Teak was divided in 1848, into three classes; first class all above 25 feet long, second 20 to 25 feet, third all under 20 feet; the limits of the first class have since been reduced to 24 feet: the different classes pay proportionate rates. All under 9 inches is called plank, which forms a large proportion of the cargo. Teak is freighted by the load of 50 cubic feet.

541 Timber shipped from *Savannah* and *Mobile* consists chiefly of pitch pine, which is similar to red pine of the best quality, but of greater specific gravity. Ships of average capacity stow about 25 per cent beyond the old measure—builder's tonnage. As this timber is chiefly converted into spars or planks where length is of great value, cutting is not allowed.

542 *Green Heart* is imported from the West Indies, chiefly *Demerara*, where vessels are fastened on the land side by warps, of, say 50 to 70 fathoms long, and on the off side by anchors, stem and stern. The timber ranges up to 70 feet long by 22 inches diameter; it is hauled off the beach by a derrick, which retains it until the strain is sustained by porting and topping purchases. The mud and slime are washed off alongside. Green heart weighs about 66lb 3oz $\frac{1}{2}$ cubic foot, and requires no ballast. The instructions for stowing at Quebec and Sierra Leone will apply here. Stow wood for chocking is plentiful. Sometimes the bow is beached to raise the hold ports. *Morra* timber is mixed with cargoes of green heart, from *Demerara*; it ranges up to 50 ft long by 20 inches diameter. All lengths of both are freighted @ $\frac{1}{2}$ cubic foot.

543 *Jacaranda* logs; New York ton, 20 cwt; Bahia 23 cwt.

544 *Nicaragua* wood; New York ton 20 cwt.

545 *New Zealand* kauri spars, hitherto imported principally for Admiralty purposes, are found only in the Auckland or northern pro-

vince, and are shipped almost entirely from Hokiangu and Kaipara, two river harbours on the north-west coast. They are generally from 50 to 100 feet in length, by 20 to 30 inches diameter. The loading is tedious. Large ports are absolutely necessary, and not unfrequently beams have to be cut and the masts taken out. Experienced stevedores may generally be obtained, but they require the watchful superintendence of the master or mate. Tackle for hauling in and stowing can be borrowed, the usual charge, however, is high; and when contemplating the reception of such a cargo, powerful purchases, chains, hooks, &c., had better be provided. As only half rates are allowed for short timber, careful computations of stowage should be previously made. In other respects the advice regarding North American cargoes is applicable to kauri spars.

546 Ships of ordinary stowage capacity will carry of the usual cargoes from American Colonial Ports, about 45 p cent beyond the builder's tonnage, allowing for deck loads which would be generally to equal $7\frac{1}{2}$ p cent; from Sierra Leone a cargo equal to the builder's tonnage is generally delivered; from Moulmein about 20 p cent above builder's tonnage; from Savannah and Mobile about 25 p cent above builder's tonnage; from Leghorn and Ancona, and West Indies, with green heart, it is rarely that ships turn out equal to the builder's tonnage, perhaps from 5 to 10 p cent less. These computations have been taken from ships built for or employed for a long period, in the trade, and have no reference to clippers built for the southern trade, and which have found their way back to the timber trade.

Intake Measurement. A master having signed a bill of lading for a certain number of deals and deal ends shipped, the charter-party stipulated that the freight was to be payable on the intake measurement of the cargo at St. Andrew's (N.B.) and on discharging at Bristol, there proving to be a deficit of deals and an excess of deal ends—held that freight was due on the measurement in this country, of the cargo landed. No proof having been given of the intake measurement, master held liable for any deficit of cargo. *The Mary Annah.*

At the Hartlepool C.C. Nov. 8, 1857, brig *Alma*: JUDGE STAPYLTON decided, that, according to the terms of the charter-party, plaintiff was to be paid so much p load for freight of timber—quantity to be ascertained by "customs' calliper" measurement. The greater part of the cargo, however, consisted of lathwood, and was measured in bulk. The difference in the freight was stated by a witness, who had measured the whole, to be £25. Judgment for plaintiff £9 11s 11d, with costs.

QUANTITIES PROPORTIONED TO A KEEL OF 850 CUBIC FEET.

17 loads Baltic squared fir	gross weight	18 $\frac{1}{2}$ tons
17 loads North American squared fir	"	13 $\frac{1}{2}$ "
17 loads Birch	"	22 "
14 923 loads masts, round	"	17 $\frac{1}{2}$ "
5-1515 standard hundred deals 120 pieces 12ft 11in 1 $\frac{1}{2}$ in	"	17 "
4-857 ditto Battens 120 pieces 12ft 7in 2 $\frac{1}{2}$ in	"	17 $\frac{1}{2}$ "

Harrison's Freighter's Guide.

At Bengal and Madras 50 cubic feet hewn timber go to a ton; at Bombay 60 cubic feet teak, square planks, and poon spars; unrated wood 14 cwt. At New York 20 cwt Nicaragua wood and all heavy dye woods; and 40 cubic feet of mahogany, square timber, oak plank, pine and other boards.

SIZES OF VARIOUS SORTS OF TIMBER.

BATTENS are pieces of sawn wood 7 inches wide and 2 to 3 inches thick.

BOARDS, all widths under 2 inches thick.

DEALS are pieces of sawn wood above 7 inches wide, and from $1\frac{1}{2}$ to $3\frac{1}{2}$ inches thick and upwards. One hundred deals contain 120 pieces.

1 standard hundred deals contains ...	1,980 inches
3 loads timber	1,800 "

Difference 180 in. or 10 ¢ cent

STANDARD DEALS; the following are the foreign and colonial standards:

Russia and Prussia	12 ft long	11 in broad	$1\frac{1}{2}$ in thick	=1ft 4in 6pts
Sweden	14 "	9 "	3 "	2 7 6
Norway	12 "	9 "	3 "	2 3 0
Christiana * &c. ...	11 "	9 "	$1\frac{1}{2}$ "	0 8 5
Dram ..	10 "		$1\frac{1}{2}$ "	
Quebec	12 "	11 "	$2\frac{1}{2}$ "	2 3 6

A Petersburg standard hundred contains 120 pieces, 12 ft long \times 11 \times $1\frac{1}{2}$ inches, or 165 cubic feet, equal in measurement to $3\frac{1}{2}$ loads—calculated for freight at 3 loads.

ENDS; Deal or Batten Ends for broken stowage, pay $\frac{1}{3}$ rds freight of deals. A Deal End is 8 feet or under, and no greater length can be insisted on unless by special agreement.

LATHWOOD, 1 fathom 4 ft long, 6 \times 6, is equal to 3 loads of timber nearly.

LOADS; 1 load squared timber is 50 cubic feet. 1 load rough 40 cubic feet. 3 loads squared are equal to 1 standard hundred deals in paying freight; see above.

PLANK is 11 inches wide and upwards, by 2 inches thick and upwards.

Fir & oak plank equal to a load of timber:—1,200 feet of $\frac{1}{2}$ inch; 600 1 in; 400 $1\frac{1}{2}$; 300 2; 240 $2\frac{1}{2}$; 200 3; 150 4; 120 5; and 100 of 6 inch.

STAVES (as cargo) 1 mille of running pipe equal to 20 loads of fir timber; see the article staves. A shock of staves is 60; a mille of staves is 1200. For broken stowage from *Memel* and *Dantzic* staves generally receive half freight.

STOWAGE, BROKEN a fathom of 4-feet lathwood though equal to nearly three loads, receives only freight equal to one load of fir timber; deal ends two-thirds. The freight of deals, staves, and other broken stowage to be subject to a special agreement.

WAINSCOT LOGS pay $\frac{1}{3}$ rd more than freight of timber $\frac{1}{2}$ load of 50 cubic feet—calliper measure. Some authorities say—By special agreement, generally $\frac{1}{6}$ to $\frac{3}{4}$ $\frac{1}{2}$ load more than timber.

Half Logs for broken stowage pay $\frac{1}{3}$ rds freight of whole logs.

A **CORD OF WOOD** for fuel consists of a pile 8 ft long, 4 high, and 4 broad. The *Admiralty* compute a cord of wood to measure 128 cubic feet, and to weigh 1,700 lbs. The computation is the same at New York.

BALTIC TIMBER.

A Standard Deal from *Christiana*, and all the southern ports of Norway, except *Dram*, is 11 feet long, $1\frac{1}{4}$ inch thick and 9 in wide.

Four deal ends, although each 6 feet long, make but a deal 16 feet long, but as freighters seldom wish to have deal ends, which run generally from 5 to 8 feet, and are taken on board as broken stowage for the advantage of the ship, she bears this burden.

Six Ends of battens, called *Larwick* palings, are counted a standard deal.

The breadth of *Norway* deals is never noticed in the calculation of freight; a good deal ought to run 9 in within the sap, which very few do; but as some are above 9 in broad, so others are only 8 inches, which makes up for the other.

The difference between the *Christiana* and *Dram* standard being nearly $\frac{1}{4}$ th part, the freights to *Dram* ought to be made in proportion with those to *Christiana*. It has sometimes happened that ships both for *Christiana* and *Dram* have been in company, and those for *Christiana* have got up, loaded, and sailed, before the others from *Dram* have got over *Dram Stroom*, which runs down very strongly in the spring of the year.

Oak plank is assorted at *Dantzic* in the same manner as *Dantzic* staves, for which see staves. Crown plank in the middle is marked C. Brack in the end and middle B; and bracks brack BB.

To distinguish $1\frac{1}{4}$ from 2, and $2\frac{1}{4}$ from 3 in; $1\frac{1}{4}$ is marked I, and $2\frac{1}{4}$ with a cross.

STANDARD DEALS, 12 ft. long by $1\frac{1}{4}$ in. thick in all the ports of RUSSIA, SWEDEN, and PRUSSIA, contained in deals from $1\frac{1}{4}$ to 3 in. thick, 10 to 20 ft. long, and to the 54th part of a deal, are proportioned as under.—

20 DEALS	$1\frac{1}{4}$ inch	2 inch	$2\frac{1}{4}$ inch	3 inch
Long	Deals pts	Deals pts	Deals pts	Deals pts
10 feet	16 36	22 12	27 42	33 18
12 "		26 16	33 18	40 0
14 "	23 18	31 6	38 48	46 36
16 "	26 36	35 30	44 24	53 18
18 "	30 0	40 0	50 0	60 0
20 "	33 18	44 24	55 30	66 36

STANDARD DEALS, 11 ft. long by $1\frac{1}{4}$ in. thick, at CHRISTIANA, and all the southern ports of Norway, except *Dram*, contained in deals from 9 to 20 ft. long, and from $1\frac{1}{4}$ to 4 in. thick, calculated to the 55th part of a deal, are reduced after the following examples.—*Baltic Ship-master's Assistant*.

20 DEALS	$1\frac{1}{4}$ inch	$1\frac{1}{2}$ inch	2 inch	$2\frac{1}{2}$ inch	3 inch	4 inch
Long	Deals pts	Deals pts	Deals pts	Deals pts	Deals pts	Deals pts
9 feet	16 20	19 35	26 10	3 40	39 15	52 20
10 "	18 10	21 45	29 5	36 20	43 35	58 10
11 "		24 0	32 0	40 0	48 0	64 0
12 "	21 45	26 10	34 50	43 35	52 20	69 45
13 "	23 35	28 20	37 45	47 15	56 40	
14 "	25 25	30 30	40 40	50 50	61 5	
15 "	27 15	32 40	43 35	54 30	65 25	
16 "	29 5	34 50	46 30	58 10	69 45	
17 "	30 50	37 5	49 25	61 45	74 10	
18 "	32 40	39 15	52 20	65 25	78 30	
19 "	34 30	41 25	55 15	69 5	82 50	
20 "	36 20	43 35	58 10	72 40	87 15	

BALTIC TIMBER.

STANDARD DEALS at DRAM, 11 feet long by 1½ in. thick, contained in deals from 12 to 20 ft. long, and 1½ to 3 in. thick, calculated to the 60th part of a deal.

20 DEALS	1½ inch	2 inch	2½ inch	3 inch
Long	Deals pts	Deals pts	Deals pts	Deals pts
12 feet	24 0	32 0	40 0	48 0
13 "	26 0	34 40	43 20	52 0
14 "	28 0	37 20	46 40	56 0
15 "	30 0	40 0	50 0	60 0
16 "	32 0	42 40	53 20	64 0
17 "	34 0	45 20	56 40	68 0
18 "	36 0	48 0	60 0	72 0
19 "	38 0	50 40	63 20	76 0
20 "	40 0	53 20	66 40	80 0

DANTZIC DEALS (out 12 inches broad), reduced to Loads, Feet, and Inches.

20 DEALS.	2 inch			2½ inch			3 inch		
Long.	load	ft	in	load	ft	in	load	ft	in
18	1	10	0	1	25	0	1	40	0
24	1	30	0	2	0	0	2	20	0
30	2	0	0	2	25	0	3	0	0
36	2	20	0	3	0	0	3	30	0
40	2	33	4	3	16	8	4	0	0

QUEBEC TIMBER.

Extracted from PARADIS' Ready Reckoner, published at Quebec, 1837.

1 Quebec standard deal contains 2 ft 3 in 6 parts
 100 do equal to 229 2 0 " or 4½ loads
 240 do " 550 0 0 " 11 "
 1 load..... " 21 deals 1 10 6 " "
 1 Petersburg do " contains 1 4 6 " or 8-5ths of
 a Quebec standard deal.

To reduce the Quebec standard deals into the Petersburg standard, multiply the Quebec by 3, and divide by 5.

The Petersburg standard hundred being 120 pieces of 12 ft long, 11 in broad, by 1½ in thick, 100 Quebec standard deals are equal to 1 hd 1 qr 16 ps of Petersburg standard deals.

100 Petersburg standard deals are equal to 60 Quebec standard,
 120 ditto do do 72 do do
 36½ do do do 1 load.

2,750 superficial feet of plank 1 in thick, are equal in cubical contents to 100 Quebec standard deals.

20 deals 12 feet 11 × 3 are generally taken as equal to one load of pine of 50 feet, though in reality equal to 55 feet cube.

A mille Quebec standard staves is 1200 pieces 5½ feet long 1½ inch thick.

THE PROPORTIONATE RATES OF FREIGHT OF THE

Timber ♣ load of 50 feet.	Round Masts ♣ load.	Deals ♣ St. Petersburgh Standard Hundred.	Standard Staves ♣ mille.	West India Staves ♣ mille.	Lathwood ♣ fathom.	Sleepers 9×10×5 ♣ piece.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 0 0	1 2 9	3 6 0	16 2 2	5 5 0	3 0 0	0 1 3
1 1 0	1 3 11	3 9 4	16 18 4	5 10 3	3 3 0	0 1 4
1 2 0	1 5 0	3 12 7	17 14 5	5 15 6	3 6 0	0 1 5
1 3 0	1 6 2	3 15 11	18 10 6	6 0 9	3 9 0	0 1 5
1 4 0	1 7 4	3 19 2	19 6 7	6 6 0	3 12 0	0 1 6
1 5 0	1 8 5	4 2 6	20 2 9	6 11 3	3 15 0	0 1 7
1 6 0	1 9 7	4 5 9	20 18 10	6 16 6	3 18 0	0 1 8
1 7 0	1 10 8	4 9 1	21 14 11	7 1 9	4 1 0	0 1 8
1 8 0	1 11 10	4 12 5	22 11 0	7 7 0	4 4 0	0 1 9
1 9 0	1 12 11	4 15 8	23 7 2	7 12 3	4 7 0	0 1 10
1 10 0	1 14 1	4 19 0	24 3 3	7 17 6	4 10 0	0 1 10
1 11 0	1 15 3	5 2 4	24 19 5	8 2 9	4 13 0	0 1 11
1 12 0	1 16 5	5 5 7	25 15 6	8 8 0	4 16 0	0 2 0
1 13 0	1 17 6	5 8 11	26 11 7	8 13 3	4 19 0	0 2 1
1 14 0	1 18 8	5 12 2	27 7 9	8 18 6	5 2 0	0 2 2
1 15 0	1 19 10	5 15 6	28 3 10	9 3 9	5 5 0	0 2 2
1 16 0	2 1 0	5 18 10	29 0 0	9 9 0	5 8 0	0 2 3
1 17 0	2 2 1	6 2 1	29 16 1	9 14 3	5 11 0	0 2 4
1 18 0	2 3 3	6 5 5	30 12 3	9 19 6	5 14 0	0 2 5
1 19 0	2 4 5	6 8 8	31 8 4	10 4 9	5 17 0	0 2 5
2 0 0	2 5 6	6 12 0	32 4 5	10 10 0	6 0 0	0 2 6
2 1 0	2 6 8	6 15 4	33 0 7	10 15 3	6 3 0	0 2 7
2 2 0	2 7 9	6 18 7	33 16 8	11 0 6	6 6 0	0 2 8
2 3 0	2 8 10	7 1 11	34 12 9	11 5 9	6 9 0	0 2 8
2 4 0	2 10 0	7 5 2	35 8 11	11 11 0	6 12 0	0 2 9
2 5 0	2 11 2	7 8 6	36 5 0	11 16 3	6 15 0	0 2 10
2 6 0	2 12 4	7 11 10	37 1 2	12 1 6	6 18 0	0 2 11
2 7 0	2 13 6	7 15 1	37 16 5	12 6 9	7 1 0	0 2 11
2 8 0	2 14 7	7 18 5	38 12 6	12 12 0	7 4 0	0 3 0

REMARKS.

DEALS.—1 St. Petersburg Standard Hundred is equal to $3\frac{1}{4}$ loads timber.

STAVES.—1 mille Standard 1200 pieces is equal to $16\frac{1}{2}$ ditto.

Ditto.—1 mille West India 1200 " $5\frac{1}{2}$ ditto.

LATHWOOD.—1 fathom of 4 feet long 6×6 " 3 ditto.

These articles should pay $\frac{1}{3}$ ds of the rates in the table, when shipped as broken stowage; but the common, though unjust practice, in open charters, is to apportion the rates for broken stowage, as follows, viz :—

DEALS.—A hundred St. Petersburg Stand'd at twice the rate charged for timber ♣ load.

STAVES.—A mille standard, at six times the rate charged for timber ♣ load.

Ditto.—A mille West India, at twice the rate charged for timber ♣ load.

Ditto.—A fathom of lathwood, at the same rate as charged for timber ♣ load.

As the ship loses freight on deals and staves, owing to the variation in the sizes and the loss in stowing so many pieces besides the loss arising from the greater thickness of the deals and staves than they carry in the specification, (a 3-in. deal measuring, on an average, $3\frac{1}{2}$ in. while staves have still greater inequalities) it is evident that these articles are more disadvantageous to the carrier, even at the rates given in the table, than is timber at its rate. The practice is, therefore, in a two-fold degree unjust, and ought to be amended.

PRINCIPAL ARTICLES OF EXPORT FROM QUEBEC.

Flour ⌘ Barrel.	Pork or Beef ⌘ barrel.	Beef ⌘ Tierce.	Wheat ⌘ Quarter.	Pease ⌘ Quarter.	Oats ⌘ Quarter.	Barley ⌘ Quarter.	Ashes ⌘ ton of 40 feet.
£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
0 2 4	0 2 11	0 4 1	0 3 9	0 4 0	0 3 0	0 3 3	0 16 0
0 2 6	0 3 1	0 4 3	0 4 0	0 4 3	0 3 2	0 3 5	0 16 10
0 2 7	0 3 2	0 4 8	0 4 2	0 4 5	0 3 3	0 3 7	0 17 7
0 2 8	0 3 4	0 4 8	0 4 4	0 4 7	0 3 5	0 3 9	0 18 4
0 2 9	0 3 5	0 4 11	0 4 6	0 4 10	0 3 7	0 3 11	0 19 2
0 2 11	0 3 7	0 5 1	0 4 8	0 5 0	0 3 9	0 4 1	0 0 0
0 3 0	0 3 9	0 5 4	0 4 11	0 5 3	0 3 10	0 4 3	0 0 9
0 3 1	0 3 10	0 5 6	0 5 1	0 5 5	0 4 0	0 4 5	0 1 7
0 3 3	0 4 0	0 5 9	0 5 3	0 5 7	0 4 2	0 4 7	0 1 2
0 3 4	0 4 2	0 6 0	0 5 5	0 5 10	0 4 4	0 4 9	0 1 3
0 3 6	0 4 4	0 6 2	0 5 7	0 6 0	0 4 5	0 4 11	0 1 4
0 3 7	0 4 6	0 6 5	0 5 10	0 6 3	0 4 7	0 5 0	0 1 4
0 3 9	0 4 8	0 6 8	0 6 0	0 6 5	0 4 9	0 5 2	0 1 5
0 3 10	0 4 9	0 6 10	0 6 2	0 6 7	0 4 11	0 5 4	0 1 6
0 3 11	0 4 11	0 7 1	0 6 5	0 6 10	0 5 0	0 5 6	0 1 7
0 4 1	0 5 1	0 7 3	0 6 7	0 7 1	0 5 2	0 5 8	0 1 8
0 4 2	0 5 3	0 7 6	0 6 10	0 7 3	0 5 4	0 5 10	0 1 8
0 4 4	0 5 5	0 7 8	0 7 0	0 7 6	0 5 6	0 6 0	0 1 9
0 4 5	0 5 6	0 7 11	0 7 2	0 7 8	0 5 7	0 6 2	0 1 10
0 4 7	0 5 8	0 8 1	0 7 4	0 7 10	0 5 9	0 6 4	0 1 11
0 4 8	0 5 10	0 8 4	0 7 7	0 8 0	0 5 11	0 6 6	0 1 12
0 4 9	0 6 0	0 8 6	0 7 9	0 8 3	0 6 1	0 6 8	0 1 12
0 4 11	0 6 2	0 8 9	0 8 0	0 8 5	0 6 3	0 6 10	0 1 13
0 5 0	0 6 3	0 8 11	0 8 2	0 8 8	0 6 4	0 7 0	0 1 14
0 5 2	0 6 5	0 9 2	0 8 4	0 8 10	0 6 6	0 7 2	0 1 15
0 5 3	0 6 7	0 9 4	0 8 6	0 9 1	0 6 8	0 7 4	0 1 16
0 5 4	0 6 8	0 9 7	0 8 9	0 9 3	0 6 10	0 7 6	0 1 16
0 5 6	0 6 9	0 9 9	0 8 11	0 9 6	0 6 11	0 7 8	0 1 17
0 5 7	0 6 11	0 10 0	0 9 2	0 9 1	0 7 1	0 7 10	0 1 18

REMARKS.

DEALS.—When bright, usually pay 5s. to 10s. per hundred less than their proportionate rate, as struck in the foregoing table, in consequence of the convenience and dispatch afforded by them, as a ship's cargo, and to cover the expense of lighterage, to which, by the custom of the port, the shipper is subject, in delivering them on board of the ship; the allowance is, of course, not made as respects floated deals, shipped in moulinettes.

WHEAT, &c.—Every description of grain pays higher rates of freight than other goods, in proportion, owing to the expense to which the ship is put for lining, &c., to receive it, and for the risk attending so perishable a cargo. An ample allowance is therefore made in striking the above rates, but the author is far from agreeing to the justice of the scale adopted in New York, in this respect, where wheat pays almost double the rate charged for Flour.

FLOUR in barrels, like bright Deals, is generally taken somewhat under its proportionate rate, owing to the small expense attending its loading as a ship's cargo.

ADMIRALTY TABLE—TIMBER.

A TABLE shewing the weight of timber in a green and seasoned state, used in ships and vessels of war; it being also the data from which the weight of the timber materials is calculated in computing the ships' displacement at H.M. Dockyard, Devonport, 1832.

CUBIC FOOT.	Green. lb oz	Seasoned lb oz	CUBIC FOOT.	Green. lb oz	Seasoned lb oz
English Oak	71 10	43 8	Cedar	32 0	28 4
Dantzic do	49 14	36 0	Larch	45 0	34 4
African Teak	63 12	60 10	Riga Fir	48 12	35 8
* Indian do, green } or seasoned, about } the same	Malabar 52 15 Rangoon 26 4		New England Fir ...	44 12	30 11
Indian Mast Peon ...	48 3	36 0	Elm	66 8	37 5
			Beech	60 0	53 6
			Ash	58 3	50 0

* The Malabar teak is the heaviest and the Rangoon the lightest of all Indian teaks used in ship-building.

NOTE.—The average weight of the timber materials in a ship or vessel of war, is about 50 lb to the cubic foot; and for the masts and yards about 40 lb.

COMPARATIVE SPECIFIC GRAVITY OF WOOD. Quantity to a Ton of 20 Cwt.

53½ cubic feet of Elm	42½ cubic feet Ash and Dantzic Oak
56½ „ Honduras Mahogany	33½ „ Spanish Mahogany
42 „ Beech	32½ „ English Oak
54½ „ Riga Fir	

The specific gravity of timber varies not only according to the different sorts of the same kind, but according to the time which elapses after it is felled. The average weight at the period of shipment is of the most consequence to masters; the above table is calculated for that purpose. Additional information on the Specific Gravity of timber will be found under the head of Gravity, pages 70 and 71.

TO FIND THE CUBICAL CONTENTS OF A PIECE OF TIMBER.

Multiply the breadth by the thickness, each in inches, and the product by the length in feet. Divide by 144, and the remainder will shew the cubical contents: thus, length of a piece of timber 20 feet, breadth 13 inches, thickness 12½.

Length	Breadth	Thickness
20 feet	: 13 in	: 12½ in
	12½	
	166	
	20	
144)3320(	23 cubic feet	
	288	
	440	
	482	
	8	

Or this way,

in	ft	
1	13	20 feet
		1 8
1	13	21 8
		1 4 3
		23 0 3

547 TIN. At Newport two or three tiers are laid on good dunnage on the floor, to make a platform; the boxes are then raised from the sides, to meet in the middle, coming as high up towards the deck as possible.

MARKS, SIZES, AND WEIGHTS OF BOXES OF TIN AT NEWPORT.

		cwt	qr	lb			cwt	qr	lb
1 C	13½ × 10	1	0	0	||	D XXX	16½ × 12½	1	2 0
1 X	... ..	1	1	0	||	D XXXX	... ..	1	2 21
1 XX	... ..	1	1	21	||	SDC	15 × 11	1	2 0
1 XXX	... ..	1	2	14	||	SD X	... ..	1	2 21
1 XXXX	... ..	1	3	7	||	SD XX	... ..	1	3 14
DC	16½ × 12½	0	3	14	||	SD XXX	... ..	2	0 7
D X	... ..	1	0	14	||	SD XXXX	... ..	2	1 0
D XX	... ..	1	1	7	||				

20 cwt to the ton freight, nett weight.

548 In the island of Banca, tin is cast in ingots from 20 to 60 lb. In China the superior sort is called Banca tin, the inferior, Straits tin.

549 TINCAL or Borax. E. I Co 16 cwt to a ton.

550 TOBACCO. The ballast is less than that for cotton, which requires, say 27 tons to every 100 tons of cargo, according to the build of the ship. Dunnage 9 inches, sides 2½. Tobacco requires a separate and distinct manifest; draft is allowed by the Customs on this article alone. For stowage see casks and general cargo, and for injury by odour from hides, see hides. Manufactured tobacco in coasting and other vessels should be stowed in a cold dry place; if it continues long in a warm position, it becomes heated and mildewed, and is liable to spontaneous combustion.

In all species of goods, with one exception, the loss whatever it may be, is paid by the underwriters, if it amounts to the required limit of damage. The warranty is destroyed and the underwriters become liable. The excepted case is tobacco, in casks, from America. On this interest the policies, I believe, invariably contain the following clause:—"In case of particular average to pay the excess of 5 ¢ cent on the value of 10 hhds." This arose from the special circumstances under which tobacco is shipped in Virginia and elsewhere. The casks which are large, are rolled down, often from a considerable distance, to the shipping place, over roads which are frequently wet and bad. So that a certain degree of damage to the outside part of the contents of the cask is expected, whether the tobacco meet with sea perils or not. It is calculated to be on the average 5 ¢ cent. Any sea damage supervening on this is to be paid. When the casks are in the warehouse the contents are taken out and the outside of the mass is cut off with hatchets, and burnt. *Hopkins on Average.*

17 hhd. weighing 10 tons, admeasure 850 feet or 1 keel. The Admiralty allows 1 hhd tobacco to a ton. At Bengal, Madras, and Bombay 50 cubic feet in bales; at Manilla 50 cubic feet in boxes and bales, of tobacco, cigars, &c; at New York 1 hogshead; and at Bahia 12 cwt leaf, in bales, 16 cwt in serons, 20 cwt in rolls, 21 cwt in mangotes, and 40 cubic feet of cigars.

A hogshead of tobacco weighs from 12 to 18 cwt. An Admiralty hogshead contains 242 lb nett; barrel 160 lb; half hhd 126 lb; and kilderkin 83 lb.

Hamburg Tares. Virginia and Kentucky, Maryland and Ohio, Scrubs, Stems, American, 10 ¢ cent; Porto Rico, leaf, 2 ¢ cent; St. Domingo, leaf, 8 lb ¢ can; Havanna, real; Brazil, rolls, 8 lb ¢ roll; ditto, leaf, 5 ¢ cent.

551 TOMMING UP or OFF is another name for shoring. When stowing it frequently occurs that a cask, case, or other package, will, as far as its own bulk is concerned, stow, where the want of sufficient entrance or the want of room to work, prevents its being stowed in the usual manner; the difficulty is increased if the package is heavy. Suppose there is space for three or more heights of casks, but an intervening beam prevents the riding tier from being stowed in the ordinary way, and compels the stevadores to stow that tier first. It is then lifted and propped up by "toms" or "shores" sufficiently high to allow the lower casks to be entered or set into their berth, when (if necessary) the toms are removed, and all the tiers properly stowed. It is an operation which in many cases requires much care, especially where the package is of great weight. Sometimes the toms capsize, and when screwing certain elastic substances, the danger is greatly increased.

552 TONNAGE Measurements and Dead-weight of cargoes of ships. A brief explanation of the nature of the register tonnage of a ship, as ascertained under the "Merchant Shipping Act, 1854"; and of the easy means it affords for estimating approximately, the measurements and dead-weight cargoes of ships.

1st—The Register tonnage of a ship expresses her entire internal cubical capacity in tons, of 100 cubic feet each; so that it is only necessary to multiply such tonnage by 100, and the entire internal capacity of the ship, in cubic feet, is immediately shewn; and from which an owner can, by making such deductions for passengers, provisions, and stores, &c, as the circumstances of the particular voyage may require, arrive at the nett space, in cubic feet, for the purposes of cargo.

2nd—To ascertain approximately, for an average length of voyage, the measurement cargo at 40 feet to the ton, which a ship can carry (as many owners may be unwilling to trouble themselves with the above-mentioned deductions), it is only necessary to multiply the number of register tons contained under her tonnage deck, as shewn separately in the Certificate of Registry, by the factor $*1\frac{1}{4}$ and the product will be the approximate measurement cargo required.

3rd—To ascertain approximately the dead-weight cargo in tons, which a ship can safely carry on an average length of voyage (dead weight bearing a certain qualified relation to internal capacity), it is only necessary to multiply the number of register tons under the tonnage deck, by the factor $*1\frac{1}{4}$ and the product will be the approximate dead-weight cargo required.

4th—With regard to the cargoes of coasters and colliers, ascertained as above, whose short voyages require but a small equipment of provisions and stores, and whose frames or shells are of larger scantling in proportion to their capacity than in the larger classes of vessels, about 10 % cent may be added to the said results; while, on the contrary, about 10 % cent may be deducted in the case of the larger vessels going longer voyages.

* The deductions necessary to be made for provisions and stores, &c. agreeably to the opinions of several experienced shipowners and brokers, are allowed for in the selection of the two respective factors; but the spaces under the deck which may be appropriated to passengers, being governed by no rule, must be made by a separate deduction, with respect to the rule for measurement cargoes, as they may be found to exist in each individual case.

5th—In the case of the measurement cargoes of steam-vessels, the spaces occupied by the machinery, fuel, and passengers' cabins under the deck, must be deducted from the space or tonnage under the deck, before the application of the measurement factor thereto; and in the case of their dead-weight cargoes, the weight of the machinery, water in the boilers, and fuel, must be deducted from the whole dead-weight, as ascertained above, by the application of the dead-weight factor.

553 TORTOISE SHELLS. At Bengal, Madras, and Bombay. 50 cubic feet go to a ton.

554 TRAGACANTH, a species of gum exuding from a thorny shrub in Persia, Crete, and the Levant; a case contains about $2\frac{1}{2}$ cwt.

555 TRANSHIPMENT. It is not binding on all occasions to tranship cargo. In case of constructive total loss, the master is not bound to repair his ship. So with a vessel sunk in deep water, with a cargo on board; the ship and cargo may be in such a state as not to repay the cost of raising, and she had better be left where she is—at the bottom of the sea. The shipowner is bound to use all reasonable care in fulfilling his contract by conveying the cargo to its destination, but is not bound to ruin himself, in order to do so. *Jessie Miller, HAYDORN v BIBBY*, C.E. March 1 and June 11, 1855.

556 TRUNKS, Chinese, are almost entirely of camphor wood; five in a nest weigh a pecul; those covered with leather are of inferior wood.

557 TURMERIC, the root of the *curcuma longa*, imported from Bengal, Java, China, &c. At Bengal 12 cwt, at Madras 14 cwt, and at Bombay 13 cwt, in bags, go to a ton.

558 TURPENTINE, a resinous juice extracted from several species of trees. The true turpentine tree is found in Spain, and the southern parts of France, as well as in the island of Chio, and in the Indies. The common turpentine is prepared from different sorts of the pine, and is quite thick, white, and opaque. Venice turpentine is a mixture of eight parts of common yellow or black rosin, with five parts of oil of turpentine. The Strasburg turpentine is extracted from the silver fir, is commonly of a yellowish brown color, and imported from Germany. In case of breakage be cautious of approaching with a light, as the vapour is highly combustible; it ought not to be placed near oil-cake, which will cause leakage of the turpentine, nor near tea, coffee, flour, &c, which it will injure by its odour; see those articles, general cargo, and tar. New York ton 6 barrels; a barrel weighs 2 to $2\frac{1}{2}$ cwt.

559 TUTENAG, Chinese zinc or spelter; E.I.Co. 20 cwt. to the ton; Bombay the same.

560 UNLOADING. Where a merchant works out one end of a ship first and causes water in her to run to the other end and damage cargo, he is responsible for the loss. *S.G. Nov 14, 1856.*

561 USAGE. Evidence of usage cannot be admitted to contradict or alter the effect of a contract, but may be given to show what is really meant. Where a charter-party stipulates that the ship is to load at Trinidad "a full and complete cargo of sugar, molasses and (or) other lawful

produce", evidence of a custom there to load sugar in hogsheads and molasses in puncheons is admissible, and the custom is sustained in law, though the effect of loading such large packages is not to fill the ship entirely, but to leave a good deal of space termed broken stowage. The shipowner has it in his power to charge a higher freight, or to introduce into the charter-party a stipulation as to broken stowage, which would overrule the custom. *CUTHBERT v CUMMING*, C.E. Feb 7 & 8, 1854.

562 **VALONIA** requires from 15 to 20 per cent of ballast, according to the build of the ship; very sharp vessels may require more. It is thrown in and rolled down with a heavy stone roller. A large carrying ship will ordinarily take her registered tonnage of Smyrna valonia, but 8 to 10 per cent less of Grecian. If shipped in a green state it weighs out at least 10 per cent less than when shipped dry; besides which the shipper often objects to its being rolled, or much rolled when green. Valonia generates heat, especially when shipped in a green state, and vessels' beams have been burnt through by valonia shipped too green; in a general cargo it should be stowed at a distance from casks of oil, wine, and other liquids, which it causes to leak.

When Mediterranean wheat is freighted at 1s per quarter, valonia in bulk should be 6/3d per ton of 20 cwt. In bags it pays 20 per cent more than in bulk.

563 **VAPOUR DAMAGE.** Very frequent and serious loss falls on merchants on the upper part of cargoes, particularly in vessels which bring wheat, Indian corn, or maize, tobacco, oil-cake, &c. by vapour damage arising from turpentine, or other scented goods, stowed in the same vessel. Perfumery, scented articles, drugs, fine oils, teas, coffee, farinas, cutlery, plate, millinery, and stationery, are liable to damage by coming in contact with or being placed near moist goods, damp bales, &c. as the steam they create penetrates every package near, and impregnates its contents with a dampness which greatly deteriorates and sometimes destroys their value. Quantities of cheese from America and Holland are constantly destroyed by being stowed near vapour goods in ill-ventilated positions, where heat is produced. Several kinds of Mediterranean fruit have the *ova* of maggots deposited in them before shipment; but these would probably never arrive at maturity if some mode of ship ventilation could be adopted. One importer suggests the possibility of supplying the hold, in damp weather, with air rarified by passing through iron ventilators fitted close to the caboose. If the after hatches were kept open when practicable, considerable damage might be prevented. Lucifer matches in cases, are very likely to impregnate other goods with the odour peculiar to themselves. Heated decks often cause injury to cargo, which is erroneously attributed to heat generated in the goods; see also, bricks.

564 **VELLUM** must be protected from dampness and from rats. A roll is 5 dozen, or 60 skins.

565 **VENTILATION.** It is of the highest importance to maintain the fullest and freest ventilation possible, for the preservation of the frame of the ship, whether built of iron or of wood, for the prevention

of injury to the cargo, and for the maintenance of the health of the crew. No distinct instructions can be given which will apply to all cases requiring management, for although by ventilation the moisture of the atmosphere arising from emanations from the cargo may be avoided if the external atmosphere be dry, yet if it be saturated with moisture, as is the case during heavy fogs, mists, or rain, continuous admission or circulation of moist air through the hold of the ship, may increase instead of abate the injury. The different methods of ventilation, the special cases requiring attention to it, may be found noticed under the articles coal, fermentation, fruit, spontaneous combustion, and vapor damage.

566 Since the introduction of the plan of erecting cabins above instead of below the main deck, it has been found that cargoes have been more liable to damage from moisture than they were previously. This has arisen from the stoppage of the ventilation which was before unintentionally promoted by the fire in the cabins, and by the free passing to and fro of the inmates. By judicious management this might possibly be remedied, as stated in vapor damage, by a ventilating shaft placed around the chimney of the caboose and of the cabin stoves, but any such contrivance should have the best attention to prevent possibility of accident from smoke conveying sparks having access to the hold.

567 VERMICELLI. E.I.Co's ton 16 cwt.

568 VERMILION. E.I.Co's ton 20 cwt; a bag 50lb. A Chinese box 50 catties; see tea.

569 VERMIN. The liability of owners for damage to cargo by vermin has been the subject of frequent litigation; some charter-parties include the words "damage by vermin excepted." When damage does occur, masters are always careful to "protest" against vermin, as early as possible after arrival. Of all those infesting ships, the rat is the most injurious, which arises from his great instinct, boldness, and natural qualifications. The inner portion of the four front teeth of rats is soft; the outer is composed of the strongest enamel; the continual growth of these teeth can only be checked by constant use. When one has been lost, the opposite tooth has been known to lengthen until it met the gum, which caused it to turn and ultimately to pass through the lip. It is this extraordinary growing property of the front teeth, coupled with an unconquerable thirst, which makes rats so formidable on board ship.

570 They will gnaw holes in casks containing water, by cunningly selecting a seam close to the chime, where the heads are thinnest, and waste the ship's store long before the voyage is completed. Casks of wine, spirits, and most other liquids, lead pipes, &c, are liable to the same attacks. They "eat" up under the waterways of the deck until within a wafer thickness of the surface, through which dew or rain can be sucked; and where there is leakage around the partners of a mast, they eat from below up to the deck, and up through the covering boards alongside a stanchion or timber-head; and unless protected by copper, will cut their way to the scupper-holes, when they hear water running

through them. Grain-laden ships have been put in great danger by holes through the pump-casing, which admit cargo and choke the pumps. The greatest peril however is when rats attack the sides between wind and water, in the vain effort to assuage their thirst. Guided by the rippling of the sea, they select a plank where the sap is gone close to a seam, and by combining together, work incessantly until salt water oozes through and they find their labour useless. The weak barrier left gives way sooner or later, the cargo is injured, and the lives of all on board are in jeopardy, especially if the holes are under the channels, in the counter, or in any other unexposed part. Where they are so numerous it seems better to give them a daily supply of water rather than risk such perils.

571 Rats will boldly come on deck in rainy weather, even in the day time, and in sight of the seamen, and will ascend the shrouds to suck water from the interstices of the rigging. They make considerable havoc among sails, especially in those parts on which oil or grease has been dropped, and evince a decided preference for new canvas, because it is softer for their nests, which are found in the bunts of the topsails, and in the jibs when stowed on the bowsprit and the ship continues long in harbour; sails should therefore be loosed occasionally for this if for no other purpose. In the hold their nests are made in the driest parts, between the frames, on the chocks, and on the knees. When two different kinds are on board one will locate forward, the other aft.

572 It is very difficult to stow anniseed so as to be secured from the attack of rats; the amount of destruction which they create in a cargo of sugar is almost incredible; they will nibble away cork bungs in casks of wine, &c. and waste the contents. The loss by mice in a cargo of rice is not so much from what they consume as by what they waste and what is lost when handling bags perforated by them. Cockroaches will attack the corks of bottles containing champagne and other delicate articles, unless protected with tinfoil or metallic capsules.

573 The ordinary and only course for the total destruction of vermin, is to stop every crevice, and smoke the ship with a fire of charcoal in the hold, or with sulphur, or mercury, &c. Charcoal fires should be made near the deck, not low down on the keelson. A practical chemist recommends chlorine instead of vapour or sulphur; the gas from chlorine is violently irritating, and its inhalation may cause serious illness if not fatal results. Some recommend the suspension of iron pots containing quicksilver, about six or eight inches above the charcoal or sulphur fires, which it is said will destroy beetles, cockroaches, bugs, &c. when quicksilver is used the residue will not be injured, nor will much have evaporated. Ships are generally smoked in dock, when the cargo is out, but if rats are found to be increasing at sea, the process can be performed in warm latitudes, where all hands can sleep on deck under awnings; for this reason every ship destined for a long voyage, should take a supply of charcoal. In all cases especial care should be observed not to allow any one to go below during the fumigation, or even to sleep in a round-house on deck, until several hours after the hold has been well ventilated.

574 Food flavoured with oil of carraway, mixed with nux vomica, will poison them; with strychnine their bodies will be found near. Phosphorus mixed with fat, heated to 150° will have the same effect especially if a good supply of water is close at hand. The use of poison however, is very dangerous, as its destructive properties may be communicated to food intended for human consumption. It is said that rats will not remain in a ship containing assafetida, and that if entirely deprived of water when close to the shore, they will leave.

575 When numerous, rats will attack the common English domestic cat, and if unsuccessful in destroying it, will much diminish its usefulness. At Milford in 1857, a cat was taken on board the guano-laden Dutch ship *Konigin der Nederlanden*, in the evening; the next morning nothing was to be seen but her skin and bones. The ring-tailed Malay cats being very strong, can more easily secure rats, with which they feed their young. Terriers are considered preferable to domestic cats, but they cannot follow vermin so easily; to be of service they should weigh 6 to 13 lbs, over that they are unwieldy. A wire trap with a wire bottom, placed on a bucket of water, has often proved successful. Rats will not eat food that has been handled, and will carefully avoid a trap that has been chafed by their own species.

576 At Calcutta there is a small earth rat with round ears, white belly, and yellow back; not so anxious for water as the common rat which they will soon drive out of the ship. These earth rats come down in the country boats, and make great havoc among hides, selecting the thick parts of the neck and rump. At Mauritius there is a species of rat, not much larger than a mouse, which will bore holes in those parts under the counters, where there is little access for air, commonly in lockers—such ill ventilated parts rotting soonest.

577 In passing the accounts for troop ships, at the *Admiralty*, a quantity of provisions, equal to one tenth part of the established proportion for the number of persons actually victualled, is allowed for waste and for destruction by vermin.

In the Court of Exchequer Baron MARTIN decided that where tubs containing Parmesan Cheese, shipped at Genoa for London, had been broken in stowing, and their contents destroyed by rats, the ship was held liable, notwithstanding there were cats on board.

The Shipping Gazette, of 27th March, 1857, says—If a Master can produce evidence to show that he has used every precaution to guard against rats, before taking in the cargo; that the ship was sea-worthy, as far as rats were concerned, when the cargo was taken in; and that, after taking it in, and during the voyage, he took every means in his power to protect his cargo from rats, and to keep clear of them; the consignee could not recover compensation from the owners. In reference to the damage caused by this class of vermin, it has been held that where rats occasion a leak in a vessel, whereby the goods are spoiled, the owners of the vessel are responsible, as they would also be if a cargo were eaten by mice, unless the master had a cat on board, in which case the ship would not be liable.

578 VINEGAR. For stowage see casks, general cargo, and liquids. An Admiralty puncheon of vinegar contains 72 gallons; hogshhead 64; barrel 36; $\frac{1}{4}$ -hhd 25; kilderkin 18; and small cask 12 gallons.

579 VITRIOL, Oil of, (sulphuric acid) should be stowed on deck, at shipper's risk, to be thrown overboard in case of necessity. It is said that if carboys of vitriol are stowed in the hold, the shipowner is liable for the entire contents of cargo, in case of fire. If absolutely necessary to stow in the hold, their being packed in sand will lessen the danger. In small coasting vessels vitriol, encased in strong basket work, is stowed on a ballast of coal having a perfectly flat surface. See acids.

100 carboys Oil Vitriol weighing 8 ton, will occupy a space of 850 cubic feet or 1 keel. When wheat is 1s $\frac{1}{2}$ qr freight, vitriol should be 7 $\frac{1}{2}$ d $\frac{1}{2}$ carboy.

Carboys of vitriol range from 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ cwt gross, generally 1 $\frac{1}{2}$ to 1 $\frac{3}{4}$ cwt, averaging 1 cwt 2 qrs 14lb.

580 WALNUTS; a bag weighs about 1 cwt, but the weight varies according to the port of lading.

581 WAR CHARTER-PARTY. *ESPOSITO v BOWDEN.* This was a writ of error from the Court of Queen's Bench, and was argued Michaelmas Term, 1856.

This was an action on a Charter-party brought against a British Merchant who had chartered the vessel before the declaration of war with Russia, to go to a Russian port, and there put on board a cargo to be conveyed to a port in this country. The question was, whether the breaking out of the war before the arrival of the vessel at Odessa, operated as a nullification of the Charter-party. Defendant pleaded that the declaration of war excused him from the performance of his contract, as it was impossible to carry it into effect without violating the law by trading with the Queen's enemies. The Court of Queen's Bench held this plea was no answer to the action. The important question upon which they had to give an opinion was, whether the plea was a good one. It was clearly established that the effect of a declaration of war was to put an end to all intercourse with the inhabitants of an enemy's country, and to make all such intercourse illegal. In 1799 some doubt was thrown upon the principle, but in 1800 Lord KENYON and the Court of Queen's Bench decided that a declaration of war was an absolute interdiction of commercial intercourse between two hostile countries—a declaration of war had all the force of an Act of Parliament. It was an exercise of the prerogative of the Crown, and every authority, particularly Lord MANSFIELD, Sir CHRISTOPHER ROBINSON, and Justice STONEY laid down that it had all the force of law, and was, in fact, a portion of the law of England. Then they had to inquire what was the effect of a declaration of war upon a contract made before, and remaining unexecuted at the time of such declaration. Authority was not wanting upon that point. It had been held by Lord ELLENBOROUGH, and laid down by Chancellor KEAT, that the effect of a declaration of war upon such a contract, was to dissolve the contract and excuse the parties from performing it. If a British subject not domiciled in an enemy's country, shipped a cargo in a neutral vessel from an enemy's port, he would be trading with the enemy and violating the law, and neither the English subject nor an alien friend could bring an action against a person for refusing to perform a contract containing an undertaking to do so after war had been declared. On these grounds the Court were of opinion that the judgment of the Court of Queen's Bench ought to be reversed, and judgment entered for the defendant.—Judgment for defendant accordingly.—S.G. 29th May, 1857.

582 **WASTAGE.** When goods are conveyed from one place to another by different vehicles or ships, the last one is considered answerable for wastage or pilfering. It is therefore sometimes necessary, when conveying valuable liquids, to take what is termed the dry inches of each cask on receipt, as a guide for the settlement of any demand on delivery. It would prevent much annoyance to shipowners and consignees, if permission could be granted by the Customs and Excise to allow officers, when required, to witness the dipping of wine and spirit in bond. See deficiency.

583 **WATER.** According to the Passenger Act, 1855, each statute passenger and seaman is entitled to three quarts of water daily, in addition to at least 10 gallons daily for cooking for every hundred statute adults on board. When casks are used, they must be sweet and tight, of sufficient strength, and of wood properly charred inside, and capable severally of containing not more than 300 gallons each; the staves of the water casks are not to be made of fir, pine, or soft wood. Sections 31, 33, and 35. By an Order in Council, May 6, 1857, any "passenger ship" with steam power sufficient to propel her, without the aid of sails, at the rate of five miles per hour, may proceed with only half the quantity of water required by the above Act, provided, 1st—That she has an efficient *apparatus for distilling* fresh water from salt water. 2nd—That the owner, &c. lodges a certificate, declaring the apparatus to be in good condition, and the number of gallons which can be distilled in 24 hours. 3rd—That the Emigration Officer is satisfied therewith; and 4th—That there is on board a person competent to manage the apparatus.

584 An experienced master says, when a large quantity of water has to be carried, the best plan is to have a couple of longers of tanks (400 gals), or casks, at the fore and after hatchways, and to rise them from the skin and carry them from wing to wing; stowing with them wet provisions, (*i. e.* salt beef, pork, &c.) you then may not only trim the ship, but admit the leakage to pass through without damaging any cargo, and the water being towards the ends of the vessel is better for lightening her than in midships. Beer, in wood, for troops, is also stowed with the water, or in the same place, for the above reasons, but generally at the after hatch.

585 It is always the practice of an experienced Liverpool passenger firm, to stow water near the fore and after hatches, by which the trim of the ship can constantly be regulated.

586 Iron tanks for containing water are usually made to fit the run or any other part of the vessel; fixed tanks, containing enough for the use of the crew, are now generally placed on the kelson, near the pumpwell or chain locker; what others are required for passengers are mostly 4 feet cube, hold 400 gallons, are moveable, and are frequently sold in the colonies when not required on the voyage home; but, if required, are often filled with merchandize, oils, &c, and are also used to contain biscuit. Tanks weigh 1½ lb to 2 lb per gal, according to shape, and occupy, *pro rata*, about half the space of casks. See magnetism. All water tanks should be well scraped and washed and then white-washed before re-filling.

587 Water which appears quite putrid when first the bung is taken out of the cask becomes sweetened by exposure to the air, in a few days or even hours. A pound of charcoal thrown into a cask of water twelve hours before use, will purify it. Gutta percha piping is the cleanest and best material to be used when water is pumped from the tanks to the decks.

588 210 gallons water are computed to a ton; 224 gallons weigh 20 cwt, reckoning a gallon to weigh 10 lbs; a gallon contains 277·274 cubic inches. 35 cubic feet of sea water weigh 20 cwt.

ADMIRALTY TANKS.

DESCRIPTION.	Capacity	Weight when empty			Cubic feet
Whole.	Gal	Cwt	qrs	lb	ft in
No. 1	600	10	1	14	98 3
" 2	500	8	2	16	82 0
" 3	400	6	3	25	65 8
$\frac{1}{2}$ edge " 4	200	4	2	25	33 2
Flat " 5 rider	200	4	2	25	33 2
Half " 6 flat	193	5	1	20	32 4
Cube " 7 old	200	4	1	24	32 10
$\frac{1}{4}$ edge " 8 "	100	2	3	20	16 6
$\frac{1}{4}$ flat " 9 rider	100	2	3	20	16 6
" 10 large	375	6	2	25	61 8
Bilge " 11 old	264	5	2	2	43 9
" 12 small	110	3	0	6	18 9

For the tonnage for freight of government tanks, see the Admiralty table of tonnage No. 2, page 18.

589 MR. BRADY, U.S. Navy, says, previous to getting on board the water tanks, a plan of stowing them may be easily arranged by means of rough models in wood, which a carpenter can readily make. In getting the tanks from the store, attention should be directed to the lid sockets, which if not properly lined with fearnought, will allow much of their contents to escape in rolling; as also to the obtaining the proper number of keys, and see that they are short enough to work between the deck and the tanks, if the vessel is a small one. White-washing tanks inside, is found by experience, to be highly useful in keeping water pure. The screws for letting off the water require very careful treatment; for they are apt if once started, never to be so tight again; and after being three or four years in use, the nuts decay, rendering the keys useless. If the water cannot be turned off from the tanks by the proper mode there seems to be no other way of getting rid of it, in case of necessity, but by forcing a hole in the bottom with a crowbar.

590 WATER-WAYS. Long pieces of timber, running fore and aft, on both sides, connecting the deck with the vessel's sides. The *scuppers* are made through them to let the water off.

591 WELL, an apartment formed in the middle of a ship's hold, to enclose the pumps from the bottom to the lower or upper deck. It is

used as a barrier to preserve those machines from being damaged by the friction or compression of the materials contained in the hold; also for preventing damage to a dry cargo by water escaping from the pumps; and particularly to prevent the entrance of ballast, &c. by which the tubes would presently be choked, and the pumps rendered incapable of service. They are also convenient for descending into the hold in order to examine the state of the pumps, &c.

592 WHANGHEES, sometimes called Japan Canes, a species of cane imported from China. The best are pliable, tough, round, and taper; the knots at regular distances from each other; and the heavier the better. The inferior are dark coloured, badly glazed, and light. At Bombay 6,000 (16 cwt) go to a ton.

593 WINGERS. Small casks stowed close to the side in a ship's hold, where the large casks would cause too great a rising in that part of the tier.

594 WINGS. Those parts of the hold and orlop-deck nearest to the side, used generally to express any part of a ship or thing nearest to the sides; as the starboard wing, port or larboard wing, starboard wing casks, &c.

595 WOOL is packed in the Australian Colonies, in bales containing from 2 to 3½ and even 4 cwt—the average is about 3 cwt. It requires about two-thirds of the usual ballast, which should be as dry as possible, and levelled fore and aft; the dunnage for the ground tiers should be laid as the bales are being stowed, the depth (if the ballast be perfectly dry) need not exceed 3 inches; this will keep the wrappers of the bales clear. Should the ballast be the least damp, as great a depth of dunnage must be laid as the heights will allow without loss of stowage, for wool will draw moisture from any damp substance near; although the bale may not touch the ballast, yet the wrapper will become damp, heated, and rotten; this of itself constitutes "damage" and the wool shares the same fate to a greater or less extent. "Stow" or "fathom" wood, when dry, is sometimes used for dunnage, there is generally a quantity on board; it does not however, lay very evenly; gum-wood trenails in the rough, are also used; they are produced in the colonies, and sell well at home, which is also the case with iron bark timber, which answers the purpose of ballast, and is excellent dunnage for wool. At Geelong, Melbourne, and Sydney, copper ore from South Australia and New Zealand is frequently taken for ballast.

596 The wing bales of the ground tier should be dunnaged at least 9 inches at the lower corners in the bilge, increased to 12 inches in the shoulders, and gradually decreased to 3 inches up the sides. The breast-hooks, pointers, pump-well, chain-locker, masts, and hold stanchions, should be carefully dunnaged, as the cargo is being stowed, and bales should not be allowed to touch iron knees. The packing of Colonial bales has been much improved lately, both as regards their form and pressing; it is now usual to compress them on shore, by hydraulic power, and to lash them with Manilla or New Zealand strands or hoop iron, at the ship's expense. The bales are generally pressed on their edges,

but sometimes for the sake of stowage, on their ends, when they are termed "dumps"; for the same reason two are frequently pressed together side by side, and are called double bales; they are secured with from four lashings to as many as may be considered necessary, and should be stowed immediately after being pressed, for if left any time, especially in the sun, the wool swells and sometimes breaks the lashings, when it must be re-pressed or stowed disadvantageously. At Sydney, New Zealand lashing is now chiefly used for baleing, but galvanized iron hoops would probably be better as they will not "give" after being pressed; there are from eight to twelve lashings to each package of Sydney wool, which are called single dumps, doubles, trebles, or fourbles, according to the number lashed together; trebles are the most numerous.

597 The method of stowing is by laying tier after tier, from the ends of the ship, as many as will breast; the longers meeting in the middle part. To make good stowage it is necessary as each tier is being stowed, to use screws of different lengths, from 6 inches up to 4 feet, together with "sampson posts" and "trunk planks," &c; the planks are of hard wood 6 or 8 ft long, 9 in broad, by 2½ or 3 in thick, with a hole in the end, the use of which will be explained hereafter; two, sometimes four of these planks, are inserted between any bales of a tier which are selected to be "screwed off," and placed, if two only are used, against the middle of their sides respectively; a short screw is entered between them, which when hove out is succeeded by others of greater length, until the bales are forced sufficiently apart to admit of another being entered between the planks, and forced in by the aid of a screw "set", against a sampson post. When the tier has been thus increased by the additional bales, it becomes so tightened as to require two and eventually four screws to set the bales apart; in the latter case four planks are so placed as to distribute the pressure equally against the "trunk bales," as the term is. The smooth surfaces of the planks materially assist the slipping of the bales, while being forced into their berth in the "trunk way," which gradually eases the screws and admits of their removal. On account of the high rate of wages at Sydney, stevadores will not "screw off" now so willingly as they did formerly.

598 It sometimes occurs that the tiers have a tendency to rise, in which case it is necessary to use toms or shores from the beams, together with a screw forcing downwards. This operation however must only be done when absolutely necessary, and then with great caution or the decks will be injuriously raised. "Tomming off" is frequently required when renewing the screws, and on various occasions incidental to the work, and for the safety of those employed, particularly when screwing in the "trunk." Great care is necessary in setting the screws to prevent their capsizing, for the collapse of the tier, from the great elasticity of the wool, has sometimes caused fatal accidents. The bale being stowed, the planks are drawn out by a tackle attached to the hole previously mentioned. A gang of stowers (which usually consists of four men for the hold) may be employed with advantage at each end of the ship for the ground tier; and when a few tiers are advanced, other two gangs can be

employed at the next or second tier, and two more gangs in the 'tween decks, if they are laid. The quantity a gang will stow varies considerably, being dependent on the amount of screwing, &c. some bales requiring much more than others. Through deficiency of height under the break of a forecastle or half-deck, or various beams, it is necessary frequently to screw *down* for stowage, for which bales screwed on end, and termed dumps, are particularly adapted; this is a tedious operation, requiring great care, as every bale has to be secured down in its individual tier, by toms, until the last bale is got in. Care should be taken to shore from beam to beam, in the wake of the screws; and the extent of screwing should be regulated by the strength of the beams, against which the screws are "set." Occasionally the lashings are cut after a bale is stowed, in order to keep it firm in its place, as on being released it immediately jams itself into the space intended for it; some however contend that two lashings should always be left on each package, to keep the strain off from the sides of the vessel, and others state that ships have had to pay heavily for damage to wool caused by cutting the bales adrift; consignees will at times refuse to receive them in that condition. Merchants contend that bales should not be pressed in any other direction than that in which the wool was packed into them.

599 Wool should, if possible, be shipped dry, when wet it is liable to spontaneous combustion, and more than one ship leaving Australia has been destroyed through non-attention to this important point. Some Australian agriculturists contend that the principal if not the only cause of spontaneous combustion, arises from the practice of clipping sheep in the morning with the previous night's dew on; if placed under a shed the danger is considerably decreased, or altogether avoided. Care should be taken to ascertain that every bale is dry in the *heart*; the usual mode of testing is with a rod. Wool frequently gets wet and damaged on the drays, on its way from the interior of the country. It then becomes dry outside, and too frequently reaches the ship for stowage in this dangerous condition. Spontaneous combustion may ensue, especially on such a long voyage as to England, in which so many changes of climate occur. Mates ought not to receive a wet package under any circumstances; they should see that all cargo is perfectly secured from rain and off the ground when giving a receipt for it; and stevedores should be urged to stow the same as soon as possible.

600 Masters should be careful in shipping wool which has not been properly cleansed from grease; the inducement to do which in preference to clean wool, is the greater amount of freight it pays from being heavier. When labour in the colonies is scarce, the quantity of greasy wool is increased to the disadvantage of the grower, who has to pay freight for grease and dirt, &c. The ship is benefitted by the dirty wool provided spontaneous combustion does not occur; some Sydney colonists doubt the possibility of such an occurrence unless it be wet. Washed wool, thoroughly dried, may be regarded as free from this risk, unless tar, oil, &c, is spilled on it. It is usually freighted @ £ 1b; *very* greasy wool 25 ¢ cent less than clean.

601 As the stowage of an Australian wool cargo is tedious, and usually occupies much time, it is highly necessary that the topsides and decks of the ship should be well caulked, in harbour, just before sailing, and after all the cargo is in, as the pressing requisite for stowing the upper bales may have opened the seams. It frequently happens in high southern latitudes, that the ship has to experience very heavy gales during the whole of her passage eastward to Cape Horn. The slightest neglect in the caulking would be sure to cause serious damage to cargo, and cannot be remedied at sea.

602 Vessels loading Sydney wool generally obtain dead weight consisting of hides, tallow, &c. Hides are spread out flat and salted in the hold; they are levelled off with trenails, a sufficient depth to keep the wool apart; hides form an excellent dead weight, are sometimes stowed in blocks, and are very useful for trimming the ship. When casks of tallow are used they are always well coopered before shipment, and common bones or hoofs are stowed in the cant-lines. On this surface is placed trenails, spokes, rattans, ox horns, shank bones, or any cargo that will not damage, and the whole is covered to prevent contact with the outsides of the wool bales; horns must be kept clear of tallow, which may injure them. Wool should never be stowed on oil, as the casks are then likely to dry, and leakage will ensue; the unevenness of stow-wood does not prevent it from being good dunnage for casks of oil. Common mats from the East Indies or Manilla, are easily obtained at Sydney, and are used with advantage on the dunnage. It is usual to agree with the stevadores to stow the whole cargo @ $\frac{1}{2}$ ton for oil, tallow, hides, bones, and measurement goods; and @ $\frac{1}{2}$ bale, large or small, for wool. Three average bales of Sydney wool, if properly pressed, will occupy about 40 cubic feet.

603 In all the Australian Colonies wool is sold @ $\frac{1}{2}$ lb, with an allowance in weight for the actual tare, and an additional allowance of 1 lb $\frac{1}{2}$ cwt for draft.

604 *New Zealand Wool* has not hitherto been packed as well as that of Australia, owing to the want of suitable hydraulic presses and sheds. As the bales are usually pressed by the master, he should if possible, be provided with two or more good wool screws. A large portion of the cargo has to be collected from outlying harbours. The bales are generally small and seldom exceed 2 to 2 $\frac{1}{2}$ cwt.

In relation to the *packing* of New Zealand wool, Mr. HURSTHOUSE in his work on that Colony, says, the fleeces should not be tied up with strings: the lint mixes with the wool, and makes what are called burls; no tying is requisite.

The bales should be pressed about 300lbs. in a small bale—a neat, square looking, well packed lot carries a better impress with it that care has been taken in the getting up and is not unlikely to turn the scale in favor of the seller. It is sometimes found that a few greasy fleeces are packed with the washed; in all cases this is a serious detriment to the whole. If a few

unwashed sheep are shorn, and their fleeces are not sufficient to fill a bale, either retain them, put them among the locks and pieces, which nearly assimilate in value, or else pack them in a bale, and mark thus—

WASHED.
GREASE.

A similar course should be pursued in all cases where two kinds of wool are packed in the same bale.

Occasionally when the Wool arrives in England, the brand is obliterated through getting wet on board the vessel; it is therefore recommended that both ends be marked. Never mark the bales on the sides only, as they are exhibited for sale end on.

605 The steam arising from some kinds of wool is disagreeable and is said to be detrimental to the health of the crew, if proper arrangements are omitted. Some recommend wooden flues (see ventilation) but the effluvia may, probably be destroyed by keeping in the hold, fore-castle, and cabins, stone jars, containing a mixture of about equal quantities of powdered alum and chloride of lime, slightly moistened from time to time, and occasionally renewed when the chlorine gas ceases to pass off.

606 Masters of coasting vessels will observe by the preceding information the great necessity there is for keeping wool dry, and apart from all oily or fatty substances in a general cargo.

4·444 tons wool, and 5·257 compressed wool will occupy 850 cubic feet or 1 keel. E.I.Co. 10 cwt carmenia wool to a ton; at Bengal, Madras, and Bombay 50 cubic feet in screwed bales go to a ton; at New York 40 cubic feet.

When Mediterranean wheat is freighted at 1s 7^{qr}, wool in bales should be 18/9 7^{qr} ton of 20 cwt. Wool compressed should be 7^{qr}ths more than clean hemp 7^{qr} ton of 20 cwt, and un-compressed 125 7^{qr} cent more or 2½ times the rate of clean hemp. Baltic wool receives double freight of clean hemp 7^{qr} ton of 63 poods gross. Black Sea wool should be 90/ 7^{qr} ton of 63 poods freight when tallow is 80/ 7^{qr} ton. See table 6, page 23.

Australian bales weigh 2, 2½, 3, and 3½ cwt, average 3 cwt. South Australia 4, 5, 6, and 7 cwt, averaging 4½ lb in the grease; the heavy bales are however very rare. Freight @ 7^{qr} lb; say ¾d for greasy, and 1d for washed, according to arrangement.

WOOL WEIGHT.

In some English counties, wool is purchased of the growers by the tod of 28lb. and in others by the stone of 14lb. In Devon and Cornwall, (where it is shorn in the grease) @ 7^{qr} lb. In Devon the score is 21lb. in Cornwall 20lb.

In the manufacturing towns the sale is by the pack of 240lb. or @ 7^{qr} lb. only; in the former by 4 7^{qr} pack; in the latter pence 7^{qr} lb. as 240 pence is £1, the £ or pence the same, and the odd weight if any would be scores or lbs.

14lb.=1 Stone. 20lb.=1 Score. 28lb.=1 Tod. 240lb.=1 Pack.

Of late years wool has been packed in odd weights as cwt. qrs. lbs. The actual tare taken off and the nett reduced to lbs. and reckoned as such. All sales of Colonial wool @ 7^{qr} lb.

607 **WRECK**, in navigation is usually understood to mean any ship or goods driven ashore, or found floating at sea in a deserted or unmanageable condition. But in the legal sense of the word in England, *wreck* must have come to land; when at sea it is distinguished by the terms *flotsam*, *jetsam*, and *lagan*; *flotsam* is when the goods continue swimming on the surface of the waves; *jetsam* is when they are sunk under the surface; and *lagan* is when they are sunk, but tied to a cork or buoy to be found again.

608 **ZEA**. Indian corn or maize.

609 **ZEDOARY**, the root of a plant which grows in Malabar, Ceylon, Cochin China, &c, of which there are three different species. It is brought home in pieces of various sizes, externally wrinkled, and of an ash colour, but internally of a brownish red. Those roots which are heavy and free from worms are to be chosen, rejecting the decayed and broken. The odour of zedoary is fragrant, and somewhat like that of camphor; the taste biting, aromatic, and bitterish, with some degree of acrimony. At Bombay 20 cwt go to a ton.

610 **ZINC** or **SPELTER**. A metal of a brilliant white colour, with a shade of blue, composed of a number of thin plates adhering together. It is rather soft, tinging the fingers, when rubbed upon them, a black colour. The specific gravity of melted zinc varies from 6·861 to 7·1, the lightest being esteemed the purest. Zinc is produced in the province of Yuan in China; and previously to 1820, large quantities of it were exported from the empire to India, the Malay Archipelago, &c. but about that time the free traders began to convey European spelter (principally German) to India; and being, though less pure, decidedly cheaper than the Chinese article, it entirely supplanted the latter in the Calcutta market.

611 **ZINC SULPHATE**, or **White Vitriol** is soluble in water; it is packed in casks of 5 or 6 cwt.

Foreign Monies, Weights, and Measures.

VALUE OF VARIOUS FOREIGN MONIES AT PAR.

The price of silver being reckoned at five shillings per ounce.

			<i>s</i>	<i>d</i>
Russia ..	100 copecks	1 rouble	3	1½
Prussia ..	30 silv'r groschen	1 Prussian dollar	2	10½
Norway ..	120 skillings	1 specie dollar	4	6½
Sweden ..	48 skillings	1 rixdollar banco	1	8
Denmark ..	96 skillings	1 rigsbank dollar	2	2½
Holland ..	100 centimes	1 florin	1	8
Hamburg	16 schillings ..	1 mark	1	5½
France ..	100 centimes ..	1 franc	0	9½
Spain ..	8 reals	1 dollar plate ..	3	1½
Portugal ..	1000 reis	1 milreis	4	8
New York ..	100 cents	1 dollar	4	2
Rio Janeiro	1000 reis	1 milreis	2	7

£1 STERLING EXPRESSED IN VARIOUS MONIES AT PAR:

The price of silver being reckoned at five shillings per ounce.

Russia	6 roubles, 40 copecks	£1 sterling
Prussia	6 dollars, 27 silver groschen	do
Norway	4 specie dol. 42½ skillings ..	do
Sweden	12 rix dollars	do
Denmark	9 dollars, 10 skillings	do
Holland	11 florins, 97 centimes	do
Hamburg	13 marks, 10½ schillings	do
France	25 francs, 57 centimes	do
Spain	6 dollars, 2½ reals	do
Portugal	4 milreis 285 reis	do
New York	4 dollars, 80 cents	do
Rio Janeiro	7 milreis, 777 reis	do

FOREIGN EXCHANGE.

IN foreign exchange, one place always gives another a fixed sum, or piece, of money for a variable price, expressed by other coins; the former is called the *certain price*, and the latter the *uncertain price*. Thus London is said to give to Paris the certain for the uncertain when the pound sterling is made exchangeable for a variable number of francs; and to Spain the uncertain for the certain when a variable number of pence sterling is exchangeable for the dollar of exchange. The uncertain price, as quoted at any time, is called the *rate*, or *course of exchange*.

FOREIGN MEASURES.

Flemish aun or ell=	..	$\frac{3}{4}$ yard Eng.	Imp. qr. 63-5076 kappar ..	} Swedish
French ditto	1 $\frac{1}{2}$ do		— 1-7841 tunna	
Do. metre	39 inches		— 21-5150 alqueires ..	Lisbon
Spanish varra	33 do		— 17-0470 do	Oporto
Turkish pike	27 do		— 5-1478 fanegas ..	Spanish
Russian archines, 100, ..	60 ells Eng		— 5-2848 scheffels ..	Prussian
German, E. Country, and Smyrna Auns :			— 2-7540 do ..	Hamburg
divide by 2 & deduct 2 $\frac{1}{2}$ ct. for Eng ells			— 2-9077 hectolitres	France
Eng yard 0-4327 canne of 8 pal. Naples			— 2-0904 toender ..	Denmark
— 0-3657 do 10 Genoa			— 1-8864 chetwerts	Russian
— 1-5387 braccio, Leghorn			— 4-7286 metzen ..	Austrian
Imp. gal. 4-5434 litres or kans			— 8-2841 killows ..	Turkish
— 0-8654 almudes, Turkish			— 5-6858 tomoli ..	Neapolitan
— 0-1358 barile oil, Leghorn			— 3-9789 sacks ..	Tuscan
— 0-1097 do of 60 caraffi, Naples			— 2-4151 muje ..	Sardinian

FOREIGN LINEAL COMMERCIAL MEASURES.

According to Baron de Prouey.

	Inches.		Inches.		Inches
Amsterdam ell (m)	27-17	Frankft on Maine ell	21-54	Palermo canne (8p)	76-46
Anvers ell, silk ..	27-33	Genoa palme	9-81	Parma fathom, silk	23-40
— wool	26-94	Geneva ell	45-02	Do. wool, cotton &c	25-34
Berlin ell, old mea.	26-28	Hamburg ell	22-55	Pavia fathom	23-42
Do. new measure..	26-55	Brabant ell	27-21	Petersburg archine	28-95
Berne ell	21-35	Hanover ell	22-99	Ragusa ell	20-80
Bologne fathom ..	25-40	Haarlem ell, linen ..	29-23	Riga ell	21-58
Brunswick ell	22-46	Do. common	26-90	Rome canne (8 pal)	73-42
Bremen ell	22-77	Leyden ell	26-89	Do. fath. (4 palmes)	33-39
Cagliari raso	21-61	Leipsic ell	22-25	Do. weaver's (8pal)	25-04
Carrara fathom ..	24-39	Lisbon vara	42-02	Rostock ell	22-64
— canne, for wood	24-59	Lubeck ell	22-71	Stockholm Swed ell	23-37
— palm for marble	9-18	Lucca fathom	23-42	Stuttgard ell (Wurt)	24-18
Cassel ell	22-41	Madrid ell (36 Sp.in)	33-38	Turin raso	23-50
Cologne ell	22-64	Mantua fathom	25-84	Venice fath for wool	26-90
Constantinopl large	26-34	Milan fathom	23-42	Do. for silk	25-14
Do. small measure	25-50	Modena fathom	25-51	Verona fathom, larg	25-55
Copenhagen ell ..	24-71	Munich ell	32-79	Do. small	25-29
Cracow ell	24-29	Naples canne (8 pal)	82-52	Vicenza fath. cloth	27-17
Cremona fathom ..	23-42	Neufchatel ell	43-74	Do. for silk	25-04
Dresden ell	23-30	Nuremburg ell	25-84	Vienna ell (Vienna)	30-67
Ferrara fathom, silk	24-97	Ostend ell	27-53	Do. Upper Austria	31-48
Do. cotton & linen	26-49	Padua fathom, cloth	26-81	Warsaw ell	23-01
Florence fathom ..	23-39	Do. for silk	25-09	Zurich ell	23-63

FOREIGN LINEAL MEASURE.

The English foot 12 inches compared with the foot measure of various foreign nations.

	inch		inch		inch
Paris foot is	12 $\frac{3}{4}$	Dantzic	11 $\frac{3}{4}$	Bologna	15
Amsterdam	11 $\frac{3}{4}$	Copenhagen	11 $\frac{3}{4}$	Dantzic	11-828
Antwerp	11 $\frac{3}{4}$	Rome	11 $\frac{3}{4}$	Danish	12-504
Leyden	12 $\frac{3}{4}$	Greece	12 $\frac{3}{4}$	Swedish	11-733
Strasbourg	11	United States	12	Grecian	12-0875
Frankfort	11 $\frac{3}{4}$	China	12 $\frac{3}{4}$	Venetian	13-954
Spain	12	Another authority says:		Rhineland	12-396
Venice	13 $\frac{3}{4}$	Paris	12-816	Strasbourg	11-424



